PUBLISHED EVERY MONDAY

Croplife®

MIDWEST MARKETING EDITION — With Added Regional Circulation to the Midwest Marketing Segment

TOTAL CIRCULATION OVER 9,070 COPIES EACH WEEK
BPA Member, Business Publications Audit

A WEEKLY NEWSPAPER FOR THE FARM CHEMICAL MANUFACTURER, FORMULATOR AND DEALER

Published by The Miller Publishing Co., Minneapolis, Minn.

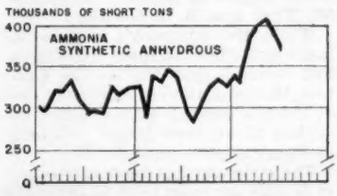
Vol. 6 | Publication at Minneapolis, Minn. Accepted as Controlled Circulation | OCTOBER 12, 1959 | Subscription Rates: $5 for 1 year, $9 for 2 years | No. 41

Monthly Inorganic Chemical Output Generally Lower

Tonnage Figures For July, 1959, Higher Than 1958

WASHINGTON — The July 1959 production levels for inorganic chemicals in the U.S. were generally lower than those reported for June 1959, but higher than for the corresponding month last year, according to a report from the bureau of the census, U.S. Department of Commerce.

Synthetic anhydrous ammonia production was 366,509 short tons for July, compared with 386,755 short tons for June and 294,669 short tons for July 1958.



Production of ammonium nitrate in July 1959 amounted to 216,296 short tons, or 876 short tons less than June 1959 but 39,548 short tons more than July 1958.

Synthetic ammonium sulfate production in July 1959 amounted to 72,926 short tons, which was less than both the June 1959 and July 1958 production. Ammonium sulfate byproduct production was 24,764 short tons, down from June 1959 and July 1958.

Production of nitrogen solutions was 40,486 short tons, compared with 52,757 short tons for June 1959 and 30,283 short tons for July 1958.

Nitric acid production in July 1959 was approximately the same as the June 1959 total, with 233,412 short tons produced. This figure was 41,620

(Turn to OUTPUT, page 21)

July Pesticide Production Down

WASHINGTON — Production of pesticides and other organic agricultural chemicals during July 1959 was down in most instances from the preceding month, according to a preliminary report issued by the chemical division, U.S. Tariff Commission.

DDT production amounted to 12,808,729 lb. during July or 179,374 lb. less than June 1959.

Production of 2,4-D acid esters and salts during July was 1,381,182 lb. compared with 2,738,076 lb. for the previous month.

July 1959 production of 2,4-D acid equivalent of esters and salts amounted to 939,670 lb., compared with 1,838,713 lb. for June.

Hexachlorocyclohexane production was 1,730,210 lb. during July or approximately the same as the June production.

The production of gamma isomer content of hexachlorocyclohexane was 444,281 lb. in July, or 59,243 lb. more than in June.

Production of 2,4,5-T amounted to 549,665 lb. in July, compared with 582,279 lb. in June.

Urea production amounted to 87,474,617 lb. in July, compared with 93,868,049 lb. in June.

Use of Chemicals Increases Per Acre Profit From Crops

By JOHN CIPPERLY, Croplife Washington Correspondent

WASHINGTON—For the past 20 years—1938-58—values of production per acre for wheat, cotton, corn, rice, peanuts and tobacco have been steadily on the increase, according to study data made available to Croplife here last week.

The increases reported in this data appear highly significant to leaders in the agricultural chemical industries and may provide some sharp selling tools for future use.

The increases noted far outstrip the higher price levels per unit obtained in this period and would still do so even if the same lower 1938 seasonal average prices received prevailed today.

In the case of wheat, for example, it is estimated here that use of chemical fertilizers and pesticidal chemicals can conservatively be credited with at least $5 of the 20 year period increase in value of production per acre.

Industry sources here consider this also to be a conservative view of the advances which have been made in returns per acre not only for wheat but also the other crops.

In view of this solid confirmation of estimates on improved gross income outlook for these crops, the following tables showing USDA data present the rather sharp changes for these major crops.

In the case of each of these four crops the climb in value of production has been steady, reflecting spotty setbacks, but the 20-year period covered generally reflects a regular advance.

It may be noted also that the value of production increase over this period is still favorable if the lowest price per unit of the crop were to be reflected for the 1958 year.

In the case of wheat and corn, while the price support levels for those crops was reduced in 1958 from the previous year, the value of production per acre still held above previous years.

One must only conclude that is a promising picture for sales managers as they prepare campaign strategy for next year's crops.

Critics of these observations may point out that weather has been a factor in each of these summaries of data. They cite better general technicology in crop production on the part of producers and also greatly improved farm equipment.

Nevertheless, granting all such

(Turn to INCREASES, page 8)

Entomologists Hear Research Results on Insect Resistance

WASHINGTON—A two-day symposium on the progress of research on insect resistance to various insecticidal toxicants conducted here Oct. 7-8 brought out the latest information on the subject from experts in the field. Sponsored jointly by the National Agricultural Chemicals Assn. and the Entomological Society of America, the sessions featured talks by representatives of the U.S. Department of Agriculture, the pesticide industry, colleges and experiment stations and the U.S. Public Health Service. Some 200 top scientists from the U.S. and abroad were in attendance.

The status of greenhouse spider mites to acaricides and the resistance of citrus mites were discussed in two papers by Floyd F. Smith, USDA, Beltsville, Md. and L. R. Jeppson, University of California, Riverside, to launch the meeting.

Dr. Smith reported that resistance lasts a long time, and can be transmitted by either sex as a simple dominant character in some species. One resistant colony exposed to no miticide for ten years retained its resistance, he reported. He said that commercial control of highly-resistant mites has been obtained since 1951 by combinations of different acaricides.

Dr. Jeppson reported that a wide variation exists in the rate at which mites develop resistance; that mites may be resistant at only one stage of development; and that the rate of resistance development in alternat-

(Turn to RESISTANCE, page 20)

Manufacturing Technology of Pesticides, Fertilizers on Agenda of ACS Conference

ATLANTIC CITY, N.J.—Problems involved in determining residues of pesticides in meat and milk, discussions on pesticide and fertilizer mixtures, papers on the importance of particle size in fertilizer granulation and other phases of fertilizer manufacturing were on the agenda during the recent 136th meeting of the American Chemical Society here. Speakers at the pesticide and fertilizer subdivisions included representatives of the manufacturing industry, government and college personnel and the Tennessee Valley Authority.

Setting the keynote for the session on pesticide residues in meat and milk, Dr. George C. Decker, entomologist with the Illinois Natural History Survey, Urbana, discussed the significance of this subject. He said that continued pesticide usage is essential to the maintenance of an adequate food supply, a well-balanced diet, and a sound public health program. However, he noted, most mammals may store pesticidal materials in fat, or excrete it in milk. The interrelationships of the several aspects of this problem demand deep study, he declared.

John P. Frawley, Hercules Powder Co., Wilmington, Del., said that positive recommendations for pesticide tolerances in milk which are "safe beyond any reasonable doubt" could be made with knowledge al-

(Turn to ACS, page 8)

Inside You'll Find

Insect Notes	4
Better Selling	9
What's New	10
Farm Service Data	14
Gloomicides	15
Oscar and Pat	16
Editorials	22
Meeting Memos	23
Advertisers Index	23

RIGHT TO SPRAY UPHELD

NEW YORK—The U.S. Court of Appeals on Oct. 2 unanimously upheld a previous decision of a lower court, to dismiss the suit by thirteen Long Island land owners who sought a permanent injunction against aerial spraying by the government in its campaign against gypsy moths. The landowners had protested that DDT and other ingredients in the spray used by the U.S. Department of Agriculture had threatened their health and were harmful to their gardens and agricultural crops.

The original suit was dismissed by Judge Walter Bruchhausen in Brooklyn Federal Court and the appeal was made by the Long Islanders to stop what they termed "unwarranted invasion" of their lands. The latest decision was written by Judge J. Edward Lumbard and concurred in by Judges Clarence G. Galston and Robert P. Anderson.

Plans Announced for Entomology Laboratory

TIFTON, GA.—New efforts toward control of corn insects are seen in the announcement that the U.S. Government has contracted with an Albany, Ga. architectural firm to prepare designs for the $530,000 entomology research laboratory to be built at the Georgia Coastal Plain Experiment Station in Tifton.

The architectural firm is the Houston Associates of Albany, Ga. The General Services Administration announced that bids for the corn insect research laboratories will be asked for at the end of April, 1960. The GSA has undertaken the building project for the U.S. Department of Agriculture, and has contracted with the architectural firm.

News of the GSA contract was released by the office of J. L. Pilcher, representative, Second District.

Included in the laboratory plans are an office-laboratory building, a general repair shop, a garage, a chemical storage building and greenhouses, the congressman's office reported.

The new building is being financed under the larger of two experiment station appropriations recently approved for Tifton by Congress.

The bill calls for an appropriation of $530,000 to be used in construction of the entomology laboratory. It also calls for $100,000 to be used in research for the purpose of finding a practical method of pelleting coastal Bermuda grass.

USDA Finds Chemical Control for Bedstraw Weed

WASHINGTON — Bedstraw, a weed threatening birdsfoot trefoil pastures in the Northeastern states, is being controlled experimentally by the use of silvex, the U.S. Department of Agriculture has reported.

The weed was controlled in test plots of birdsfoot trefoil by one overall spray of 2-(2,4,5-trichlorophenoxy) propionic acid (silvex)—followed by spot treatment of surviving plants. Although the first harvest of birdsfoot trefoil was reduced by the herbicide, normal yields were obtained in subsequent cuttings, USDA says.

Purpose of the tests was to find an herbicide that could control bedstraw not only in non-crop areas, but also in meadow and pasture crops such as birdsfoot trefoil. The experiments were conducted by Dr. Marvin M. Schreiber of the agricultural research service at Ithaca, N.Y., in cooperation with the Cornell University's agricultural erperiment station.

Most efficient control of the weed was obtained by spraying, during the early stages of growth in the spring, 2 lb. an acre of silvex ester, or 4 lb. in amine salt form, USDA said. Each chemical for the overall spray was applied in 30 gal. water an acre. Spot treatments of remaining light infestations were made with a hand sprayer, at the rate of 3 lb. in 30 gal. water an acre.

Bedstraw infests pastures, meadows, ditch banks, roadsides, and waste areas. The deep-rooted perennial, which first grows upright and later forms a dense mat, competes vigorously with crops for water, nutrients, and light. Grazing animals usually avoid bedstraw, enabling the weed to spread. It is resistant to herbicides generally used to control weeds in pastures, some crops, along ditch banks, and roadsides.

DEBENTURE OFFERING

NIAGARA FALLS, N.Y.—Hooker Chemical Corp. received subscriptions for $24,054,900, or 98.4%, of the $24,444,900 principal amount of 5% Convertible Subordinated Debentures due 1984, offered to its common stockholders under rights which expired Sept. 30. The underwriting group, headed by Smith Barney & Co., has sold the $390,000 principal amount of unsubscribed debentures.

AGRICULTURAL DIVISION "brass" of American Cyanamid Co. congratulate farm advisor John L. Quail (far left), Fresno County, Cal., as he receives Cyanamid's county agent award. Next to Mr. Quail, from left to right, are: B. F. Bowman, marketing director; H. E. Clark, western regional manager; H. H. Phillips, assistant western regional manager, and E. H. Smythe, assistant marketing director. The silver plaque award, the third to be presented by the company, is given to outstanding county agents in the nation. The event took place in Fresno, Cal.

Cotton Council Entomologist Discusses Multiplication of Boll Weevil Numbers

WASHINGTON — Some cotton farmers now have to fight three times as many boll weevils as they did 12 years ago.

This was pointed out by Dr. H. G. Johnston of the National Cotton Council, Memphis, Tenn., in a symposium here on research progress on insect resistance.

Cited were records at the U.S. Department of Agriculture's Cotton Insect Laboratory, Tallulah, La. Since 1947 there has been a 98% increase in the average number of weevils hibernating in the fall and a 210% increase in the number surviving in the spring.

Through irrigation, increased fertilization—and other new practices—the farmer has increased production efficiency since 1947. These practices, however, have intensified the boll weevil problem, Dr. Johnston said.

Growing period of cotton has been extended later in the season. Effects of hot dry weather—one of the most effective natural controls for the weevil—have been virtually eliminated. The practices also lead to rank growth and other conditions more favorable to a rapid build-up of weevils.

The entomologist said the population build-up in late season accounts for a tremendous increase in the number of weevils entering hibernation—and thus a potential increase in the number emerging in the spring.

"With favorable weather conditions during the growing season," Dr. Johnston said, "there now is an overwhelming weevil population before the cotton crop is mature."

To fight the increased number of weevils, farmers expanded their use of insecticides. These two factors, the council entomologist said, soon led to the boll weevil developing resistance to five commonly used insecticides.

Other chemicals are available that will control boll weevils and other resistant insects. But there is no assurance that any of the pests will not also develop resistance to these insecticides. Actually, there is evidence to indicate they probably will, Dr. Johnston said.

Arizona to Study Plant Water Evaporation

TUCSON, ARIZ.—The University of Arizona watershed management division has begun a three-year research effort to determine how much moisture plants give off, financed by the Charles Lathrop Pack Forestry Foundation.

"Since water is a limiting factor in all our lives," Dr. A. L. McComb, project director, said, "we must get more efficient use."

He stated this means cutting down on evaporation where possible and choosing plants that grow best with the least water.

Dr. McComb added that studies indicate that evaporation takes half the water given to the land and plants lose the other half by transpiration, or breathing.

Sprayer, Duster Meeting

YAKIMA, WASH.—A regional aerial sprayers and dusters conference is being sponsored by Norkem Corp. of Yakima, Wash. and is to be held by the Hotel Chinook in Yakima on Oct. 26-27. The theme of the conference will be "Expanding Horizons of Aerial Application."

Arkansas Research Center To Attempt Brush Control in Ozark Region

HARRISON, ARK.—The forest research center here will soon begin work in an attempt to solve the control of brush on land in this Ozark Mountain region.

Sen. J. William Fulbright announced that the U.S. Department of Agriculture will allocate to the center an additional $10,000 this year to "develop an improved basis for proper use and practices for the brushland in the broad Ozark region."

Although the project is to be carried out in cooperation with the University of Arkansas, which has recently begun to swing toward the use of chemical sprays as a means of control, it was not immediately learned if the research would involve chemical usage.

Sen. Fulbright said he believes the results of the research could bring about "the placing of millions of acres of waste land in Arkansas to productive uses."

He estimated there are 3,500,000 acres of land in north Arkansas now covered with scrub timber and brush. The senator said small scale efforts by private landowners in recent years have proved that much of this acreage could be converted to commercial timber production or grazing land.

The Thompson Chemical Co. of St. Louis several years ago aerially sprayed several thousand acres of this type land in north Arkansas and south Missouri.

The firm still maintains an experiment station near Branson, Mo., in the Ozarks. A number of private landowners, taking a cue from the Thompson firm, had several thousand acres sprayed by airplane.

Monsanto Acquires Nitro Property Holdings

CHARLESTON, W.VA.—Monsanto Chemical Co. has acquired all of the outstanding stock of Nitro Industrial Corp., a realty company with extensive property holdings in and around Nitro, W.Va., in exchange for 27,685 shares of Monsanto's common stock.

Real estate which changed hands in the transaction includes more than 700 acres of industrial, commercial and residential property in the Nitro area, including some 180 acres of vacant land adjacent to Monsanto's present 58-acre plant site.

Robert M. Morris of St. Louis, Monsanto vice president and general manager of the company's organic chemicals division, said that the acquisition, under negotiation since last June, accommodates plans for future expansion by Monsanto of its production capacity in the Kanawha Valley industrial area.

Nitro Industrial Corp.'s activities are not affected by the change of ownership, Mr. Morris said. N.I.C. will continue its realty operations as a wholly owned subsidiary of Monsanto.

Monsanto is extending its line of agricultural chemicals produced at Nitro and now manufactures there a synthetic protein supplement for poultry feeds.

L. H. Butcher Company In New Facilities

SEATTLE, WASH.—The L. H. Butcher Co. is now occupying its newly expanded facilities located at 560 First Ave. S. in Seattle.

While the company's new warehouse and office facilities are a threefold increase over the former quarters, the acquisition of additional land at the new location points to the possibility of an even larger expansion as future requirements dictate.

The company has been in business in Seattle for more than 40 years and is a subsidiary of the Udylite Corp., Detroit, Mich.

The Butcher firm also plans additional expanded warehouse facilities in other key Northwest areas.

FIRM ORGANIZED

NEW ORLEANS — Liquid Fertilizer & Feed Corp., New Orleans, has been organized with capital stock of $100,000 and been granted a state charter to deal in liquid fertilizer.

Franklin Wheeler

JOINS NEW YORK FIRM—Franklin Wheeler has joined the New York office of H. J. Baker & Bro., chemical importers and exporters, to assist in the development of new markets and general product promotion. He was for three years sales manager for Allied Chemical International Corp., and is a graduate of Cornell University. Mr. Wheeler also spent three years with Wells Fargo of Cuba, and six years in the specialty division of American Agricultural Chemical Co.

POTASH COMPANY OF AMERICA

QUICK SERVICE
HIGH QUALITY

New 60% Standard Muriate
New 60% Special Granular Muriate
New 60% Coarse Granular Muriate
Sulphate of Potash
Chemical Muriate — 99% KCL minimum

Phone, write, telex, or wire us
Phone STerling 3-4990, Washington
TWX No.—WA-331

POTASH COMPANY OF AMERICA
CARLSBAD, NEW MEXICO.

General Sales Office . . . 1625 Eye Street, N.W., Washington, D.C.
Midwestern Sales Office . . . First National Bank Bldg., Peoria, Ill.
Southern Sales Office . . . Candler Building, Atlanta, Ga.

INSECT, PLANT DISEASE NOTES

Spotted Alfalfa Aphid Scattered Over Utah

LOGAN, UTAH — Recent surveys have shown that the spotted alfalfa aphid is now scattered over nearly all of Utah, according to Dr. G. F. Knowlton, extension entomologist at Utah State University.

Now commonly found as far north as Brigham City, the aphid has not done extensive damage north of Beaver County.

Each season, damage has been less than occurred the year previous, which is encouraging, says Dr. Knowlton. In 1955 damage to alfalfa forage and seed crops reached nearly $1 million in Utah and many newly planted alfalfa fields were killed out by the pest, Dr. Knowlton said.

Actually, during 1958 and 1959, the pea aphid has caused more extensive losses to Utah alfalfa crops than the spotted alfalfa aphid.

Late Insect Damage Reported in Georgia

ATHENS, GA.—Insect damage was caused to certain crops in Georgia in late September, the Georgia Crop Reporting Service reported.

Grassworm and armyworm infestation was heavy on coastal Bermuda, alfalfa, soybeans and millet in local areas, the reporting service said. Some growers are harvesting hay early to reduce damage.

Damage from scab is severe on unsprayed susceptible pecan varieties, it was reported. However, an above-average production of pecans was expected in central and northern districts.

Late Blight Threatens Connecticut Potato Crop

STORRS, CONN. — Late blight threatened Connecticut potatoes, reported Dr. Arthur Hawkins, extension service potato specialist.

Dr. Hawkins advised spraying potato foliage with a fungicide every week until the vines died or until the growers were ready to kill the vines with a chemical vine killer.

Late blight was found in a regularly sprayed field of potatoes in the Windsorville area.

Soybean Cyst Nematode Found in Illinois

WASHINGTON—The soybean cyst nematode, known in some areas of the U.S. since 1954, has been found in Illinois for the first time, the U.S. Department of Agriculture reported. Infestations also were found in August in Kentucky and Missouri in addition to those previously known in these two states.

Found on a farm near Mounds, in Pulaski County, Illinois, the nematodes were identified by nematologists of USDA's Agricultural Research Service, as the species that attacks soybeans.

The nematodes were also found in Ballard County, Kentucky, in mid-August, on 50 acres in two locations. As of Aug. 31, 16 properties representing 1,055 acres were known to be infested in Ballard and Fulton counties.

In Missouri, new infestations were found on 19 properties during August. These new finds brought Missouri's total of infested properties up to 204, representing 6,928 acres.

Surveys to determine extent of the new infestations are being made by ARS and state workers. The tiny eelworms also occur in Arkansas, Mississippi, North Carolina, Tennessee and Virginia. A federal-state program to prevent their spread is now under way.

Feeding on roots of soybeans, the nematodes cause a stunting condition known as "yellow dwarf." Several years may elapse after they get into a field before they reduce crop yields. However, once established they build up rapidly and can eventually destroy entire fields of soybeans.

Hoja Blanca Disease Found in Louisiana

BATON ROUGE, LA. — The rice disease, Hoja Blanca, or the vector that spreads the disease, or both have been found in seven of Louisiana's rice parishes.

Just how serious this may be to the rice industry, no one can say, Kirby Cockerham, specialist with the Louisiana State University agricultural extension service, said. However, he asserted, the situation demands serious consideration from all interested in the rice industry.

Since the discovery of the vector and the disease in St. Tammany parish, both have been found in St. James, St. John and Iberville parishes. In all, the disease or the vector has been found in seven parishes on 21 properties, involving some 4,674 acres. It seems likely, Mr. Cockerham pointed out, that all fields in the rice-growing section of the Mississippi river, south of Hwy. 190, will be infested with the vector before the end of the season.

Because of the gravity of this situation, entomologists, plant pathologists, rice breeders and other scientists from the LSU experiment station and extension service, the Louisiana Department of Agriculture and the U.S. Department of Agriculture met recently on the LSU campus to discuss this problem, Mr. Cockerham said.

The USDA and the state depart-

Take those big preseason savings on LION® E-2 now!

It's the one and only ammonium nitrate you can safely store for big spring markup and extra profit! Lion E-2 is free-flowing when you get it...free-flowing when you sell it...no matter how long you store it!

NO CAKING...GUARANTEED. Lion E-2 prills won't break down, crumble or cake under the heavy weight of stacking in shipment or storage. E-2 is free of dust and fines ... not affected by extreme temperature changes or humidity. You and your customers can buy now, store safely until used. Guaranteed storage-stable.

TAKES LESS STORAGE SPACE. Lion E-2 has the greatest density of any ammonium nitrate on the market. It's less bulky ... takes 20% to 25% less storage space. It saves you needed floor area. It isn't necessary to spread out E-2 in smaller stacks like old style forms of ammonium nitrate. With E-2 you stack higher utilizing all available storage area. without fear of caking.

EASY-TO-HANDLE BAGS. Lion E-2 multiwall bags are specially coated with Monsanto Syton®—the antislip agent that lets you stack Lion E-2 higher ... move it faster ... handle it easier. It helps you save time, work and space ... reduces material losses through breakage due to slippage.

NEW LION E-2

Always stores...

Always pours

MONSANTO CHEMICAL CO.
Inorganic Chemicals Division
St. Louis 66, Missouri

Monsanto

ment of agriculture are now cooperating in treating fields where the vector, Sogata orizicola, has been found in an effort to eliminate the insect and prevent its spreading to additional fields. Rice from vector-infested fields that is to be moved into the main rice-producing belt is being fumigated before movement.

Scouting for the disease and the insect has been conducted in various sections of rice producing areas, and survey work will continue as long as fields are suitable for determining the diseases and the vector. Plans have been made to begin research work immediately at LSU to study both the vector and the disease, it was said.

Pale Western Cutworm Increasing in Canada

LETHBRIDGE, ALTA.—The pale western cutworm, the most important cutworm in dryland agriculture in the prairie provinces, is increasing in numbers, says L. A. Jacobson, entomologist at the agricultural research station here.

Between 1952 and 1957 this cutworm was not a menace to crop production, but with the return of dry seasons increased infestations have been found. In 1958 and 1959 losses occurred in west-central Saskatchewan and adjoining areas in Alberta and crop damage is expected in 1960, particularly if spring conditions are dry. Mr. Jacobson recommends that farmers in these areas examine their crop next May for thinning or patchiness and if cutworms are present, he says, the field should be sprayed promptly with insecticides to prevent further loss.

Mr. Jacobson says that the population of cutworms can be forecast one year in advance because the abundance of the pest is associated with rainfall. An increase in cutworms in any area is expected when there are less than 10 wet days in May and June of the previous year. A day is considered wet when rainfall is in excess of ¼ in.

Each year rainfall reports are received from over 200 weather reporting stations in western Canada and with this information cutworm forecasts are made. In addition, a check is made later by observing the number of moths that emerge from the feeding larvae, moths are counted on flowers of goldenrod and sunflower during last August and early September, and the duration of the egg laying period is noted.

USDA Entomologists See Possible 'Hopper Invasion

WASHINGTON—The U.S., which hasn't been invaded by locusts in more than 70 years, may not yet have seen the last of them.

Two experts say the grasshoppers may be in a "resting phase", awaiting favorable conditions for another outbreak.

Findings of Dr. Ashley B. Gurney of the U.S. Department of Agriculture and Dr. A. R. Brooks of the Canadian department have just been reported by the Smithsonian Institution.

The last great locust migration was in the late 1870's. But, say the two entomologists, the possibility that a remnant population of these grasshoppers still persists somewhere cannot be ignored.

That there have been invasions of similar great grasshopper hordes in the past is shown by the so-called "Grasshopper Glacier" in Montana's Beartooth Mountains. Melting of the ice leaves piles of grasshopper remains two to four feet deep.

Presumably, Dr. Gurney says, hordes flying over the glacier became chilled and landed on the ice where they were trapped by snow-falls and permanently preserved.

The two entomologists speculate that this species of grasshopper, as is known to be the case with some other species, exists in two "phases," a solitary phase and a swarming one.

The solitary phase may continue for many years.

Then, for reasons still unknown but probably influenced with climatic changes, great explosions of population take place, the urge to migrate occurs, and the great invasions begin.

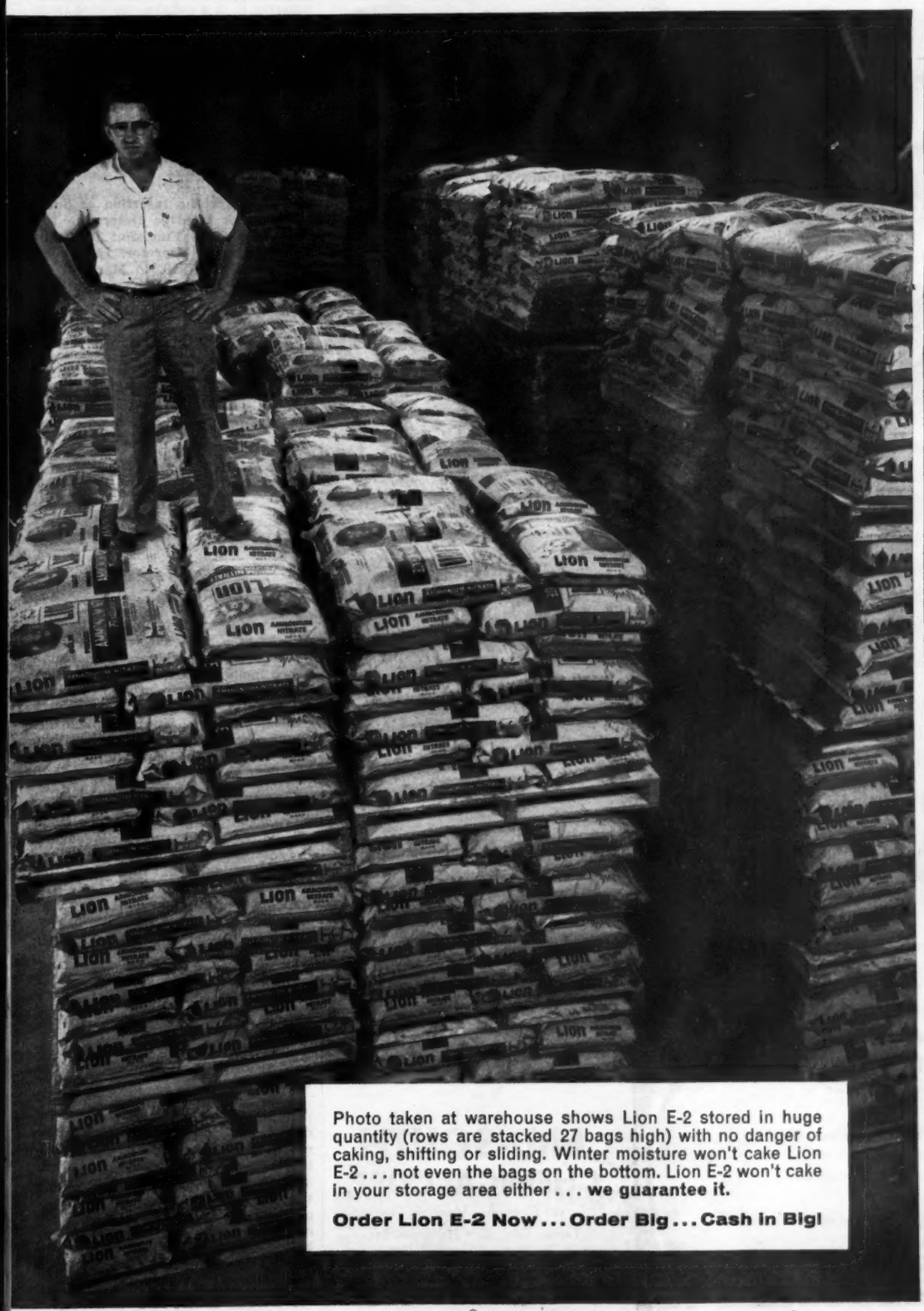


Photo taken at warehouse shows Lion E-2 stored in huge quantity (rows are stacked 27 bags high) with no danger of caking, shifting or sliding. Winter moisture won't cake Lion E-2 . . . not even the bags on the bottom. Lion E-2 won't cake in your storage area either . . . **we guarantee it.**

Order Lion E-2 Now . . . Order Big . . . Cash in Big!

Arizona Cotton Needs Controls for Top Yields

PHOENIX, ARIZ.—Cotton is still squaring and blooming in many fields in central Arizona and the Yuma area. If frost holds off long enough and bollworms, leaf perforators and salt marsh caterpillars are controlled, the state can still make a good top crop and increase its yields to a good 1959 average.

Cotton bollworms and leaf perforators are injuring many bolls and squares in cotton fields of Maricopa and Pinal counties. In many instances, controls will still pay.

Another hatch of beet armyworms is appearing in certain areas of Pinal County and the small worms are injuring half-grown bolls.

Salt marsh caterpillars are present in some parts of Maricopa and Yuma counties, and controls will be profitable. Salt marsh caterpillars were also found in the Parker area. —J. N. Roney.

Armyworms Invade Louisiana Sugar Cane

DONALDSONVILLE, LA.—Claude Songy, county agent, has reported an infestation of armyworms in the sugar cane in Ascension parish on the Palo Alto plantation.

Mr. Songy said that in two days the armyworms completely stripped leaves off 40 acres of recently planted cane. Warnings have been sent out to farmers in the area to be on the lookout for the worms which work quickly.

New Mexico Farmers Told to Seek Aphids

UNIVERSITY PARK, N.M.—New Mexico farmers were urged to be on the alert for spotted alfalfa aphid infestations by John J. Durkin, entomologist with the New Mexico State University Extension Service.

Infestations of one aphid per plant can cause severe loss of stand.

Root Knot Nematodes Found in California

SACRAMENTO—Root knot nematodes have been found in Lake County, Cal., in the vicinity of Lakeport, Buckingham Park and Clearlake Highlands.

Russell H. Gripp, farm adviser, reports these soil pests can become serious in soils producing vegetables, some field crops and grapes. It is not known how the nematodes were introduced.

Mr. Gripp has urged Lake County residents not to bring soils and plants into the county from other sources.

PATENTS and TRADEMARKS

2,885,278

Herbicidal Compositions Containing Esters of 1-Ethynylcyclohexanol. Patent issued May 5, 1959, to Karl Brack, Wilmington, Del., assignor to Hercules Powder Co., Wilmington, Del. As a new composition of matter an ester of the group consisting of the symmetrical carbonate and sulfite of 1-ethynylcyclohexanol and the unsymmetrical carbonates and sulfites of 1-ethynylcyclohexanol and an alcohol in which the alcohol radical is selected from the group consisting of alkyl, cycloalkyl, aryl, oxa-substituted alkyl and oxa-substituted cycloalkyl.

A composition for application to growth media which normally support growing roots of vegetation for prevention of the growth thereof which comprises a compound of claim 1 and a dispersing agent therefor, the concentration of said compound in said composition being in the range of 0.1% to 2%.

2,904,421

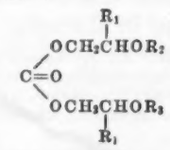
Method of Destroying Grasses. Patent issued Sept. 15, 1959, to William H. Seaton, Columbus, Ohio, assignor to Monsanto Chemical Co., St. Louis, Mo. The method of destroying grass which comprises applying to the ground before the grass emerges a lethal concentration of 2,4,5-trichloroanisole.

2,906,662

Method for Combating Fungus Employing C_5Cl_8. Patent issued Sept. 29, 1959, to Emery J. Carlson, Summit, N.J., assignor to Allied Chemical Corp., New York. A method of combating fungus which comprises applying to the material susceptible to attack by fungus a fungicidal composition containing as an essential toxic ingredient a chlorocarbon having the empirical formula C_5Cl_8 and characterized by being a pale yellow, odorless, crystalline solid having melting point of substantially 132° C.-133° C., being soluble in carbon tetrachloride and diethyl ether, slightly soluble in acetone, xylene, methanol, ethanol and isopropanol, insoluble in water, exhibiting characteristic absorption maxima in the infra-red region, when combined with potassium bromide in pellet form, at the following frequencies expressed in reciprocal centimeters: 1587, 1351, 1282, 1205, 1176, 1149, 1053, 990, 806, 735, 704 and 662 and having a composition by weight of approximately 27.5% carbon and 72.5% chlorine.

2,904,422

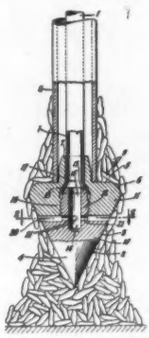
Method of Eradicating Weeds. Patent issued Sept. 15, 1959, to Joseph M. F. Leaper, Lansdale, John Russell Bishop, Hatfield, and Wood Powell Anderson, Conshohocken, Pa., assignors to Amchem Products, Inc., Ambler, Pa. A process of eradicating weeds which comprises applying to a field containing such weeds a herbicidally effective amount of an organic carbonate having the structural formula:



wherein R_1 is a member selected from the group consisting of hydrogen, methyl radical and ethyl radical, and wherein R_2 and R_3 are radicals selected from the group consisting of substituted and unsubstituted phenyl, cresyl, xylyl and naphthyl radicals, the substituents in the substituted radicals being members of the group consisting of chlorine and bromine.

2,904,443

Method for the Insertion of Sampling Tubes Used to Determine the Dispersion of a Fumigant in Grain and Apparatus Therefor. Patent issued Sept. 15, 1959, to Marshall M. Manns, St. Louis, Mich., assignor to Michigan Chemical Co., St. Louis, Mich.



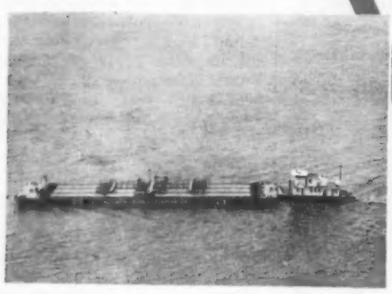
A method for determining the dispersion of a fumigant within a body of a vapor-permeable food material which includes the successive steps of positioning a pipe around flexible tube the end of which is connected to a suction-head through which air can be drawn into the said flexible head, forcing the said suction-head downwardly into the body of food material to a predetermined depth by applying force to it through the said pipe, withdrawing the said pipe from around the flexible tube while leaving the said suction-head at the predetermined location within the body of the food material and still connected to the flexible tube now extending upwardly through the food material and out of its surface, and after a fumigant gas has been released within the said body of food material, sucking air through the said suction-head and the said flexible tube and measuring the amount of the fumigant gas contained in the air, and withdrawing the said flexible tube and the suction-head from the said body of food material.

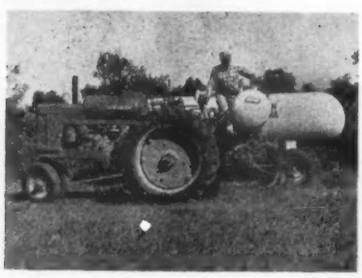
A device for determining the completeness of the fumigation of a body of stored food material which comprises a flexible tube and a suction-head which is generally conical in shape and is composed of a cone section and a base section; the said cone section being generally conical in shape and having an internal chamber, a plurality of perforations extending from the said chamber to its conical surface, an externally threaded cylindrical section terminated by a

BIG N

it's BIG N all the way from factory to field

Our own factory, barge, rail and rail transport system. These are what keep supplies moving. It is the only fully integrated system in the ammonia industry. Big N's the brand to tie to.





BIG N

FOR COMPLETE INFORMATION

Mail this coupon to Mid-South Chemical Corporation, 1222 Riverside Blvd., Memphis, Tenn.

Please send me information on Big N and Big N Service_____

_____

_____

(NAME)

_____

(ADDRESS)

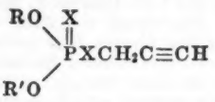
MID-SOUTH CHEMICAL CORP.

1222 Riverside - Memphis, Tenn.
Farmer City, Ill. • Harlingen, Tex.
Lake Charles, La. • Mt. Vernon, Ind.
New Iberia, La.

truncated conical section and a perforation extending through the said cylindrical section and into the said chamber; and the said base section having generally the shape of a truncated cone with its conical surface connected to its base by a rounded shoulder, a tapered guide section centered on the base with a flat annular bearing surface around the said guide surface, a centered cylindrical perforation extending through the said guide section and the remainder of the section, which consists of an internally threaded inner section, the threads of which engage the threads of the external threads of the cone section, a smaller outer section in which the end section of the flexible tube is positioned, and an internally conical surface connecting the two cylindrical sections which cooperates with the truncated conical section in clamping the end of the flexible tube stretched over the truncated conical section with its passageway communicating with the perforation extending through the externally threaded portion of the cone section.

2,906,661

Treating Agricultural Soils with Propargyl Phosphorothioates. Patent issued Sept. 29, 1959, to Joseph W. Baker and George A. Saul, Nitro, W.Va., assignors to Monsanto Chemical Co., St. Louis, Mo. The method of destroying parasitic worm life in nematode-infested agricultural soils which comprises contacting the said organism with a toxic concentration of a compound of the structure



where R and R′ are selected from the group consisting of lower alkyl and lower alkoxy substituted lower alkyl groups and X represents a chalkogen of atomic weight less than 40, at least one of which is sulfur.

Industry Trade Marks

.The following trade marks were published in the Official Gazette of the U.S. Patent Office in compliance with section 12 (a) of the Trademark Act of 1946. Notice of opposition under section 13 may be filed within 30 days of publication in the Gazette. (See Rules 20.1 to 20.5.) As provided by Section 31 of the act, a fee of $25 must accompany each notice of opposition.

Design, two Dutch-costumed figures with ribbon containing words Van Brode, for insecticides. Filed March 12, 1959, by Van Brode Milling Co., Inc., Clinton, Mass.

Design, outline of flying bird with words Johnston's No-Flys across top, for insecticides. Filed June 14, 1954, by Gaston Johnston Corp., Long Island City, N.Y. First use March 1, 1954.

Design, vertical blocks with figure of marching soldier and hand spray gun with word Flit inscribed, for bug killer in pressurized and non-pressurized containers. Filed March 6, 1958, by Esso Standard Oil Co., New York, N.Y. First use at least as early as May 1, 1954.

Gard-All, in capital letters, for liquid insecticide. Filed Dec. 4, 1958, by J & L Adikes, Inc., Jamaica, N.Y. First use Nov. 12, 1958.

Zep, in capital letters, for insecticides and other products. Filed Dec. 31, 1958, by Zep Manufacturing Corp., Atlanta, Ga. First use Jan. 1, 1937.

Zep-O-Kill, in capital letters, for insecticide. Filed Dec. 31, 1958, by Zep Manufacturing Corp., Atlanta, Ga. First use March, 1954.

Zeposector, in capital letters, for insecticide. Filed Dec. 31, 1958, by Zep Manufacturing Corp., Atlanta, Ga. First use March, 1957.

Dimecron, in capital letters, for chemical substances for killing weeds and destroying vermin, preparations for combating plant pests. Filed Feb. 27, 1959, by Ciba Limited, Basel, Switzerland.

Camparol, in capital letters, for ingredients used in the manufacture of herbicides. Filed March 25, 1959, by Geigy Chemical Corp., Ardsley, N.Y. First use Jan. 30, 1959.

Dimetane, in capital letters, for ingredients used in the manufacture of insecticides. Filed March 25, 1959, by Geigy Chemical Corp., Ardsley, N.Y. First use Jan. 30, 1959.

Dimetalin, in capital letters, for ingredients used in the manufacture of insecticides. Filed March 25, 1959, by Geigy Chemical Corp., Ardsley, N.Y. First use Jan. 30, 1959.

Gro-Spike, in capital letters, for fertilizer. Filed March 24, 1959, by Creative Products, Inc., Gary, Ind. First use Feb. 13, 1959.

Ferti-Ground, in capital letters, for fertilizer in dehydrated, concentrated water soluble powder form, and in liquid form, for direct ground application. Filed March 31, 1959, by Clover Chemical Co., Pittsburgh, Pa. First use Sept. 11, 1958.

Plans for NPFI's Chemical Control Problems Conference Announced

WASHINGTON—Plans for the National Plant Food Institute's Conference on Chemical Control Problems, to be held at the Terrace Banquet Room, Shoreham Hotel, Washington, on Oct. 15, were announced by Dr. Vincent Sauchelli of NPFI.

Included on the agenda:

● "Statistical Methods for Chemical Analysts," W. J. Youden, National Bureau of Standards.

● "Magruder Check Sample Statistical Analysis: How to Use the Data," Edwin M. Glocker, W. R. Grace & Co., research center.

● "Relation of the State Regulatory Office to the Local Fertilizer Industry," R. Z. Rollins, chief, Bureau of Chemistry, California Department of Agriculture.

● "How Management Regards the Role of the Chemical Control Laboratory," Nelson White, vice president, International Minerals & Chemical Corp.

● "How Firm a Foundation," John Brabson, chemical development division, TVA.

● A panel discussion on "Tolerance Levels in Chemical Fertilizer Analyses" will be presented by F. W. Quackenbush, state chemist and seed commissioner for Indiana; C. H. Perrin, research chemist, Canada Packers Ltd., Toronto; H. J. Webb, chief chemist, fertilizer inspection and analysis, Clemson Agricultural College, and A. J. Duncan, Johns Hopkins University.

DECLARES DIVIDEND

NEW YORK—The board of directors of Witco Chemical Co., Inc., at its meeting on Sept. 25, voted a regular dividend of 25¢ per share, payable on Oct. 31, 1959, to shareholders of record as of Oct. 9, 1959.

Successful Farming gives 21 choices to State & Regional Advertisers

20 State & Regional Editions of Successful Farming—in January 1960			
Edition	States	Circulation*	B&W Pg. Rate
1	Iowa, Illinois, Indiana, Nebraska, Minnesota, Wisconsin	608,297	$3,955
2	Illinois, Indiana	218,956	$1,860
3	Iowa	128,670	$1,160
4	Minnesota	116,748	$1,050
5	Nebraska	67,646	$ 625
6	North Dakota, South Dakota	82,225	$ 760
7	Wisconsin	76,277	$ 705
8	Iowa, Illinois, Indiana	347,626	$2,780
9	Iowa, Minnesota	245,418	$2,085
10	Iowa, Nebraska	196,316	$1,720
11	Minnesota, Wisconsin	193,025	$1,690
12	Minnesota, North Dakota, South Dakota	198,973	$1,740
13	North Dakota, South Dakota, Nebraska	149,871	$1,350
14	Illinois, Indiana, Ohio	320,412	$2,565
15	Iowa, Minnesota, North Dakota, South Dakota, Nebraska	395,289	$3,065
16	Iowa, Illinois, Indiana, Wisconsin, Minnesota	540,651	$3,785
17	Illinois, Indiana, Ohio, Wisconsin, Michigan	464,985	$3,370
18	North Dakota, South Dakota, Nebraska, Kansas	217,241	$1,850
19	Iowa, Nebraska, Kansas, Missouri	339,268	$2,715
20	Middle Atlantic, New England	138,385	$1,245

*A.B.C. Publisher's Statement, 12/31/58

Fertilizer advertisers in SUCCESSFUL FARMING *starting January 1960 will have a choice of 20 State and Regional Editions, plus the national edition.*

The new SF editions make it possible to match message and map, put more power and push in areas of high potential, give salesmen extra support locally, intensify advertising impressions, test new product plans.

They give the national advertiser a new local merchandising tool. Opposite any four-color page of "national" advertising, the advertiser can have a facing "local" page tie-in ad, either in black and white or black plus one color, featuring price and listing dealers.

The new editions also fit the needs of the hundreds of advertisers whose distribution is limited to a single state or groups of states. Advertising units acceptable range from one-third page black and white to multi-page, special units.

Fertilizer advertisers in the new editions enjoy all advantages of SUCCESSFUL FARMING ... influence based on fifty-seven years of service, helping farmers earn more money; an audience, whose average farm is 336 acres, with estimated annual cash farm income averaging around $10,000 for the past decade, and last year reaching the all-time peak of $12,120!

The nearest SF office will gladly tell you more about the 1960's biggest fertilizer sales opportunity!

MEREDITH PUBLISHING COMPANY, Des Moines ... *with offices in* New York, Chicago, Atlanta, Boston, Cleveland, Detroit, Los Angeles, Minneapolis, Philadelphia, St. Louis, and San Francisco.

ACS

(Continued from page 1)

ready available. However, continued acquiescence to the demands for absolute proof of safety for pesticides in milk and the resulting "no tolerance in milk" philosophy will only prolong and augment the educational and public problems in the future by suggesting that a relaxation of safety requirements has occurred, he said.

A researcher from the Kettering Laboratory, Mitchell R. Zavon, Cincinnati, Ohio, told the group that pesticide residues in milk and meat should not be blamed for ills of mankind. He said that careful analysis of what is known of the clinical effects of these materials does not corroborate claims that illnesses are caused by this means. Moreover, mortality statistics for the period prior to the introduction of modern pesticides compared to the era of modern pesticide use likewise fail to reveal positive evidence of deleterious effect, he declared. At the same time, he went on, a constant appraisal of the clinical situation is necessary to detect any unsuspected effects early and to prevent undue energy being spent on investigating unsupported theories.

Other papers presented at the pesticide portions of the meeting dealt with methods of bioassay and determination of the presence of various toxicants by spectrophotometry and other methods.

A paper by Robert M. Creamer, USDA, Beltsville, Md., discussed the uniformity of toxicant distribution in fertilizer-pesticide mixtures. On the basis of laboratory studies, he said that more uniform mixtures resulted when the toxicant was added as a solution than when added on an impregnated carrier. Mixtures thus prepared exhibited only a third as large variations in concentration as those prepared with solid carriers, he said. Uniformity of mixtures improved when the fertilizer had a narrow particle size range. Variations in mixtures made from screened portions of a fertilizer were only half those obtained from the unscreened fertilizer.

Stirring a fertilizer during toxicant addition reduced variations to two-thirds those of unstirred mixtures. Mixture uniformity was not influenced by the nature or volume of the solvent, nor by the rate of addition of solution.

Pesticides were preferentially sorbed by the porous components of a mixed fertilizer. The porous phosphates sorbed as much as 13 times the toxicant sorbed by potassium chloride.

Pesticides, he said, were also preferentially sorbed by the smaller particles. A decrease of 50% in particle diameter resulted in an average increase of 37% in sorptive capacity, Mr. Creamer reported.

The effect of muriate of potash particle size on granulation characteristics of a 5-20-20 fertilizer was discussed by Edwin C. Kapusta, U.S. Potash Co., Division of United States Borax & Chemical Corp., New York. He told the ACS group that the growing practice of fertilizer granulation has focused increased attention on the properties of the solid and liquid plant food sources used in fertilizer formulation. Coarse forms of muriate of potash have found increased acceptance in the granulation of low nitrogen-high potash content mixed fertilizers. Plant scale tests were made to study the effect of muriate of potash particle size on the granulation characteristics and physical and chemical properties of a 5-20-20 fertilizer.

Studies were carried out under typical operating conditions in commercial fertilizer plants employing continuous and batch type granulation units, he said. Product temperature, moisture content, and particle size distribution were determined at various points in the process. Recycle rates were measured. Distribution of plant foods in the finished products was investigated.

Economies of plant operation were enhanced by the use of the more coarsely divided muriate of potash products. Sulfuric acid and moisture requirements decreased and lower recycle loads resulted from the use of the coarser muriates. Also, desired production rates were more easily attained and maintained. Plant food distribution was less uniform when coarse muriates of potash were employed. The use of finely divided muriate resulted in a more uniform plant food distribution, but the fertilizer product contained less than the desired quantity of potash.

Myron S. Anderson, USDA, Beltsville, Md., presented a history of soil testing procedures. The development of this technique, he said, came in three approximate periods, the first of which extends from 1906 to 1925, when emphasis was placed on fundamental chemical composition of soils as related to crop production. These data now provide background information for interpretation of soil tests. A third period includes essentially the years 1925 to 1952 with ramifications extending to the present. This is a period during which many new methods were developed. Some of these were designed for universal application, while others were applied to specific soil problems.

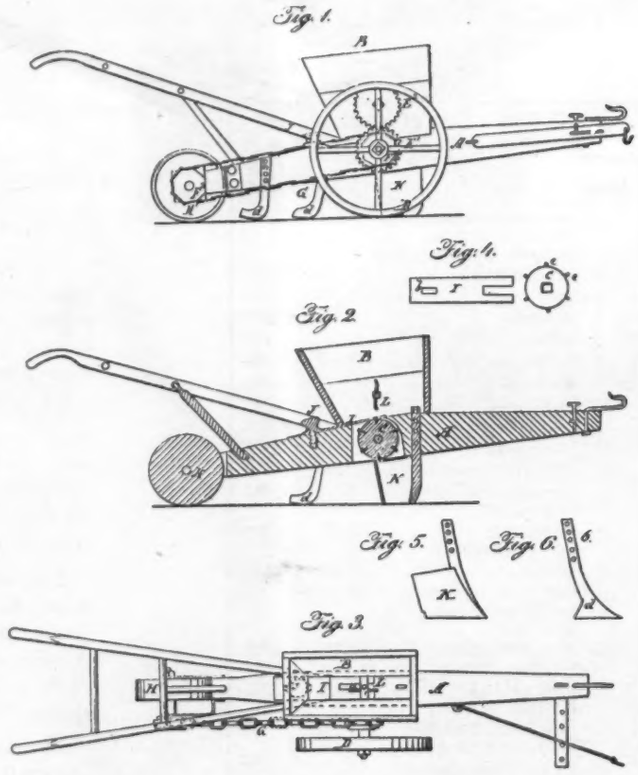
His discussion placed emphasis on phosphorus and potassium, with other elements also considered.

A description of the Saint-Gobain phosphate process in an integrated fertilizer plant was presented in a paper prepared by Robert S. Sibley and A. C. Goodman, Fluor Corp., Whittier, Cal., and Frank Bless and R. A. MacDonald, Coastal Chemical Corp., Pascagoula, Miss. The report was made from work done at the Coastal Chemical plant which produces 75 tons a day of phosphoric acid and 300 tons a day of ammonia phosphates. The paper said that the plant differs from most in that the installation is a fully integrated unit utilizing phosphate rock, sulfur, and natural gas basic raw materials. Products are phosphoric acid, sulfuric acid, and a variety of fertilizers including ammonia, superphosphates, and granular complete ammonium phosphates of varying formulations.

The Saint-Gobain wet phosphoric acid process differs from previous processes by use of a unique single-stage rock digester rather than the usual multistage system. The paper said no sacrifice is experienced in maintaining high reaction yields, low sulfuric acid consumption, and filterability of by-product gypsum crystals. The 30% P_2O_5 acid produced can be used without further concentration in Saint-Gobain's ammonium phosphate process featuring a rotating shell granulator to produce granular high analysis fertilizers.

Fertilizer Application

In Years Gone By



APPLICATION PROBLEMS were bothering farmers back a hundred years ago as evidenced by attempts by inventors to overcome such difficulties. On Sept. 27, 1859, Z. N. Morrel, Cameron, Texas, was granted patent No. 25,574 for a machine which claimed to "improve fertilizer distribution."

General construction of the machine was similar to a plow, the inventor wrote, with a fertilizer hopper being placed on the beam. In a slot under the hopper, was a distributor wheel activated by the driving wheel (D). The fertilizer passed through the distributor wheel into a hollow boot (K) which is open at the bottom, allowing the fertilizer to fall into the furrow made by the wedge-shaped forward edge of the boot.

The inventor pointed out that the front lower corner of the boot is rounded so it may slide or jump over clods of earth or stones. The shares following the boot turn the dirt from each side back into the furrow after the fertilizer has been placed.

The type or analysis of fertilizer material to be used was not discussed in the patent papers. Illustration is from original pat-

Dr. Karl A. Folkers

RECEIVES AWARD—A New Jersey organic chemist and research executive, Dr. Karl A. Folkers, was cited for an outstanding contribution to agricultural and food chemistry by winning the 1959 Charles F. Spencer Award. The award is jointly sponsored by the Kansas City section of the American Chemical Society and Spencer Chemical Co., also of Kansas City. The award, which includes a medallion and $1,000 honorarium, founded by Kenneth A. Spencer, chairman of the board of Spencer Chemical, in 1955 in memory of his father, is administered by the Kansas City section of the American Chemical Society.

INCREASES

(Continued from page 1)

qualifications, the final conclusion must be that more adequate use of all crop production chemicals has been a large contributing influence since the increase in value of production per acre for these crops has been generally steady. Any temporary reversals of the trend have been more than corrected in the following year.

It also must be noted that this data reflects average figures and hints strongly that the peak plateau of chemical sales is far from having been attained.

TABLE 1—WHEAT

Year	Yield per acre, bu.	Seasonal average per bu.	Production value, per acre
1938.....	13.3	$0.56	$7.47
1958.....	27.3	1.72	46.90

TABLE 2—COTTON

Year	Lb.	Cents per lb.	Value per acre
1938.....	235.8	8.60	$21.19
1958.....	469.0	33.1	160.93

TABLE 3—CORN

Year	Yield, bu.	Per bu.	Value per acre
1938.....	27.7	$0.486	$13.45
1958.....	51.7	1.11	57.31

TABLE 4—RICE

Year	Estimates, lb.	Cwt.	Value per acre
1938.....	2,196	$1.42	$31.25
1958.....	3,309	4.81	159.23

BEMIS SALES UP

ST. LOUIS — Sales of the Bemis Bro. Bag Co. and subsidiaries for the first six months of this year totaled $64,069,940, up 11% over 1958, and the company's net income of $1,313,038 was 14% higher than the comparable period of last year, the firm has announced.

'Golden Rule' Creed Pays Off With More Business For Mississippi Dealer

By EMMETT ROBINSON and ED WHITE
Special Croplife Writers

"When a man comes into our store we try to treat him so he will want to come back again."

That's the business creed followed by Harris Hubbard, partner and manager of the Panola Seed & Feed Co., Batesville, Miss. Application of this version of the "Golden Rule" has helped Mr. Hubbard increase his volume by a steady 10% a year since the business was founded 13 years ago.

The theme of service carries over into the company's advertising methods. Backbone of the direct mail advertising is three personal letters written by Mr. Hubbard to every person who has done business with him during the previous year.

Shortly after the first of the year Mr. Hubbard writes a short letter simply expressing appreciation for the customer's business. There is no selling message but the time and money involved are not wasted. Said one customer, "Yours is one of the few businesses which has ever written me a personal letter simply thanking me for my business. People don't forget things like that."

About the last week in February a second letter goes out calling attention to the lines carried by the Panola Seed & Feed Co. This letter is timed to coincide with the time of the year that farmers make financial arrangements for the coming crop season.

The third personal letter goes into the mail in the fall plugging fall seeds, pasture grasses and other items. Prices are not mentioned in either of the latter letters.

Mr. Hubbard writes the original letter himself and then has the local newspaper print several hundred of them on his stationery. "It costs more to have the letters printed than it does to mimeograph but I think the improved appearance is well worth it," Mr. Hubbard said. The letter is printed in two versions—one for farmers and one for Batesville residents who trade with him.

"It pays to tailor these letters," Mr. Hubbard explains. "Naturally the man living in town isn't going to be interested in cotton pest insecticides while the man on the farm isn't likely to purchase a great amount of peat moss."

Almost all of the advertising placed by the firm is paid for with the help of national farm supply manufacturers. "We take advantage of every dollar we can get this way," Mr. Hubbard said. "Without this we'd have to sharply restrict our advertising."

Newspaper advertising is built strictly around seasonal items. The newspaper schedule usually begins in March with a series of six insertions measuring two columns by 6 in. Later insertions are made as the changing farming seasons bring different products to the front.

Most of the radio advertising is in the form of spots. "We set up our spot schedules to catch the farmers when they are home," Mr. Hubbard said. "During the farming season we think that's about the noon hour. In the late fall and early spring we concentrate our radio effort about breakfast time, say about seven o'clock in the morning." The spot radio campaigns again push the seasonal items.

Mr. Hubbard works closely with the vocational agriculture teachers in his trade area and with their farmer clubs. "One of the best things we do is furnish speakers for their programs. Sometimes I speak myself but more often I arrange for specialists from insecticide, fertilizer and feed companies to appear. I also get these fellows to help farmers with some problems they can't solve themselves. It's good business for these companies and builds a lot of good will for me," Mr. Hubbard commented.

Batesville is the headquarters for a 16 county Four-H livestock show each year and Mr. Hubbard furnishes feed for the animals while they are quartered in the pavilion. He figures that it is not only a good public relations move but he knows that many of the Four-H boys will become good customers of some farm supply store in the future.

Mr. Hubbard believes in keeping up to date himself, not only with the newer agricultural chemical products but in merchandising techniques. As an example, he attended a sales promotion program at the University of Mississippi to pick up ideas to help

(Turn to 'GOLDEN RULE,' page 14)

AN ATTRACTIVE store plus plenty of parking space adds up to more customers for the Panola Seed & Feed Co., Batesville, Miss.

Sales of Chemicals Help Store Keep Its Customers

By JESS BLAIR
Croplife Special Writer

The Davis Feed & Seed Store of Jackson, Miss., was one of many such firms throughout the country which had been caught by an expanding city. Once it had plenty of parking space and was on the outskirts of town, but Jackson has grown fast.

"We might have lost our country trade," explained Duncan Esterling, an assistant manager, "except that we began stocking items to bring farmers to us. Many b'g feeders now buy direct from the mills at the edge of town, but we can still sell the little fellows. And our fertilizer and insecticide business is very good."

The store has two delivery routes, one for town and the other goes to Florence, a small town where the company has many customers.

Mr. Esterling has found a way to make the delivery pay for itself. The cost is figured in on the price of the items bought. For a sack of chick starter the price is $1.75 delivered or $1.65 at the store, and other items have a similar margin.

In selling fertilizer and insecticides, the store has a crew of three employees, says Mr. Esterling, who advise aand work closely with farmers.

"We have learned all we could about the soils, plants and insects of this area," he said, "which helps in keeping satisfied customers. This is a wet, humid climate where soils leach their plant food and the insects thrive. Fertilizers and insecticides must be used or the farmer won't make anything."

By stocking a large supply of both and being able to advise growers on what to use, the store has maintained a good sales record on farm chemicals.

"Knowing how to apply it also counts," said Mr. Esterling. "And in discussing this phase, we often make sales of sprayers, dusting equipment and allied items."

One sales booster came with the advent of the fire ants. While not widespread yet, they are making a sporadic appearance and farm owners are trying to stave off the advance.

"We've sold a lot of ant killer," said Mr. Esterling. "We found out what was needed, then stocked it and told farmers about it."

Another trend has been in pelleted fertilizer and in the farmers using 50-lb. bags instead of 100-lb. sacks. Laborers are difficult to

(Turn to CHEMICALS, page 11)

Product Displays Important

DISPLAYING merchandise is an important factor in selling, according to careful observations at the Eiland Implement Co., Lamesa, Texas. After various trials in displaying fertilizer and insecticides, Mrs. Betty Ables (above), manager of the garden and nursery department, found one method that increased sales 100%. "I had used several small displays of packaged goods," she explained, "putting a small pile of one kind here and another there. Finally when results were still poor, I built this massive display midway between the front door and the cash register, and just far enough to one side for customers to pass. Sales immediately doubled and stayed that way until the peak of the fertilizer season had passed." Another way of moving goods is to change the displays frequently. Except for the large display shown here, Mrs. Ables frequently moves items to new locations. Sometimes an item that doesn't sell in one part of the store will immediately start moving if changed to another part. "One other thing we do to speed up sales," she said, "is to sell small items in a group. Instead of selling a single shrub for $1.00, I sometimes put three in a group and price them at $2.99. We have occasionally increased the sale of some plants 300 percent by this method."

WHAT'S NEW

IN PRODUCTS · SERVICES · LITERATURE

To obtain more information about items mentioned in this department simply: (1) Clip out the entire coupon in the lower corner of this page. (2) Circle the numbers of the items of which you want more information. Fill in the name and address portions. (3) Fold the coupon double with the return address portion on the outside and fasten the edges with a staple, cellophane tape or glue. (4) Drop in the mail box.

No. 6965—Gibberellin Bulletin

Merck & Co., Inc., announces an extensive technical bulletin on its brand plant growth substance "Gibrel." The bulletin contains such chapters as "Agricultural and Horticultural Uses," "Gibrel in Relation to Plant Nutrients," "Reported Responses," "The Methods of Use," "Typical Properties," "Solubility Data," "Analytical Methods," "Biological Studies" and a bibliography and abstracts. According to the bulletin's preface, the results of work done by agricultural station workers are quoted or reflected in the report. For more information, check No. 6965 on the coupon and mail.

No. 6967—Lawn Fertilizer Spreader

The Cyclone Seeder Co., Inc., announces the Cyclone Model B Lawn Spreader. According to company literature, features include freedom from fertilizer streaks, accuracy of application and extra-wide spread of up to 8 ft. Width of the spread varies from 4 ft. to 8 ft., depending on the weight of the material. Seed, fertilizer, lime, ice melters and granular herbicides, insecticides and other pesticides can be applied with the spreader, the company said. Material is thrown in a fan-shaped pattern ahead of and to the sides of the spreader. Rates can be varied from 4 oz. to 30 lb. per 100 sq. ft. An on-off knob on the handle gives positive shutoff, the company said. For details, check No. 6967 on the coupon and mail.

No. 6966—Literature on Containers

Carbolineum Wood Preserving Co., Inc., announces a new flyer which discusses the company's three color, all lithographed 5 gal. cans. The flyer is in color and contains photographs of the cans. Information about the display advantages of the cans is included. For more details, check No. 6966 on the coupon and mail to this publication.

No. 6964—Liquid Fertilizer Applicator

A liquid fertilizer applicator has been developed by Dempster Mill Manufacturing Co. The applicator, designated the No. 600 "LiquiJector," will be available in models for either anhydrous ammonia or liquid fertilizer solutions applications. Anhydrous ammonia models come equipped with a choice of the Dempster Model B adjustable stroke positive displacement metering pump or flow valve delivery, the company said. Solutions models are equipped with Dempster Model SN or SC metering pumps. The pumps are driven direct from the ground wheel. Axles are adjustable from 72 in. to a maximum of 84 in. width; by changing the forward bracket setting of the double acting hydraulic lift, the applicator operates with either high or low clearance; the 2 in. sq. tool bar can accommodate either regular rigid beams or Dempster 1⅛ in. double coil spring shanks. For more information, check No. 6964 on the coupon and mail.

Also Available

The following items have appeared in previous issues of Croplife. They are reprinted to help keep dealers on the regional circulation plan informed of "What's New."

No. 6958—Nitrogen Pamphlet

Commercial Solvents Corp. has prepared an informative pamphlet describing the function of nitrogen in supplying the needs of soil bacteria. The folder is 3½x6½ in. so it may be placed in envelopes for mailing to customers. CSC makes the folder available to dealers, and there is a space for imprinting dealer's name on back. The literature is appropriate for fall fertilization schedules and describes the aspects of the firm's "Hi-D" ammonium nitrate product. Copies of booklet are available by checking No. 6958 on the coupon and mailing.

No. 6962—Information On Spreader

A folder and price sheet on the Tyler Spreader is available from the Tyler Manufacturing Co. The folder contains a drawing of the fertilizer spreader in use, plus photographs and construction features. The price sheet contains price information on all of the firm's models plus prices on optional equipment. For copies of the folder and price sheet, check No. 6962 on the coupon and mail to this publication.

No. 6961—Lining Materials Data

Gates Rubber Co. announced the availability of a data sheet entitled "Corrosion Resistant Characteristics of Rubber and Plastic Lining Materials." The sheet contains revised tables showing the temperatures of various corrosive solutions that each Gates Tank Lining stock can withstand, the company said. For more information, check No. 6961 on the coupon and mail to this publication.

No. 6956—Tolerance Folder

A wallet-size agricultural chemicals tolerance folder, giving limitations of days prior to harvest, has been announced by United Heckathorn. The new folder is revised with up-to-date tolerances including the newer pesticides, the company says. Copies of the folder can be obtained by checking No. 6956 on the coupon and mailing to this publication.

No. 6959—Combination Spreader

Gaddis Bros. Manufacturing Co., Inc., has announced the Model 100 "Dual-Purpose Combination Spreader." The unit features a triple drive fan assembly incorporating a two-speed transmission, cab-controlled, allowing simple shifting for wide or narrow spread applications of lime and fertilizer, whichever is desired.

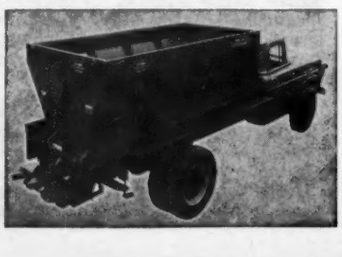
Two 20 in. diameter distributor fans have built-in slip clutch drive arrangement which eliminates all chain and sprocket drives, the company says. The 34 in. conveyor drag chain is driven by a 50:1 worm gear drive case with a 2 in. drag shaft driving 12 tooth steel conveyor drive sprockets. The 50° sloping sides along with the wide conveyor eliminate bridging of materials and allow self-cleaning of unit, the company says. For more information, check No. 6959 on the coupon and mail.

No. 6960—Weed, Brush Killer

A weed and brush killer developed especially for control of deep-rooted weeds and weed trees has been introduced by Allied Chemical's General Chemical Division. Called "Urab," the herbicide is effective against scrub oak, wild hickory, sassafras, poison sumac and other weed-trees, the company said. Also listed by the company as being controlled by the product were trumpet vine, briars, cattails, Canada thistle and all types of brush. The killing ingredient in "Urab" (3-phenyl-1, 1-dimethylurea trichloroacetate) is soluble in water. The product is not recommended for use where the roots of desirable plants extend and professional or experienced operators should apply, the company said. For more information, check No. 6960 on the coupon and mail.

No. 7649—"New Leader" Spreader

Highway Equipment Co. announces the New Leader L-72S Spreader with extra steep sloping sides (about 60°) designed to haul and spread material of a damp and dense consistency. In addition to the steep sides and formed contour for better flow, the company says the equipment features laterally reinforced end-



Send me information on the items marked:

- ☐ No. 6956—Tolerance Folder
- ☐ No. 6957—Farm Chemical Catalog
- ☐ No. 6958—Nitrogen Pamphlet
- ☐ No. 6959—Combination Spreader
- ☐ No. 6960—Weed, Brush Killer
- ☐ No. 6961—Lining Materials Data
- ☐ No. 6962—Information on Spreader
- ☐ No. 6964—Liquid Fertilizer Applicator
- ☐ No. 6965—Gibberellin Bulletin
- ☐ No. 6966—Literature on Containers
- ☐ No. 6967—Lawn Fertilizer Spreader
- ☐ No. 7680—New Package Size
- ☐ No. 7649—"New Leader" Spreader

(PLEASE PRINT OR TYPE)

NAME .....

COMPANY .....

ADDRESS .....

SLIP OUT—FOLD OVER ON THIS LINE—FASTEN (STAPLE, TAPE, GLUE)—MAIL

FIRST CLASS PERMIT No. 2 (Sec. 34.9, P. L. & R.) MINNEAPOLIS, MINN.

BUSINESS REPLY ENVELOPE
No postage stamp necessary if mailed in the United States

POSTAGE WILL BE PAID BY—

Croplife

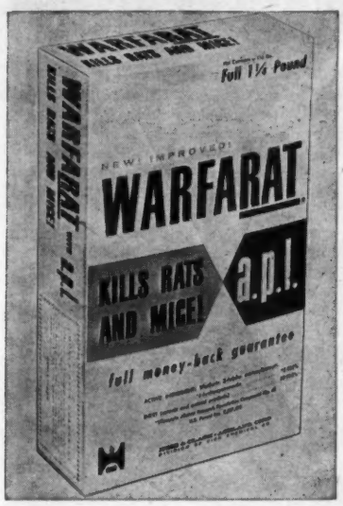
P. O. Box 67

Reader Service Dept. Minneapolis 40, Minn.

gates. A high carbon steel drive shaft in the conveyor gear case turns the 30 in. conveyor chain. Twenty inch spinners uniformly distribute material, the company said. The spreader is available in four different body lengths from 9 ft. to 15 ft. with respective capacities from 5.2 to 8.8 cu. yd. For details check No. 7649 on the coupon and mail.

No. 7650—New Package Size

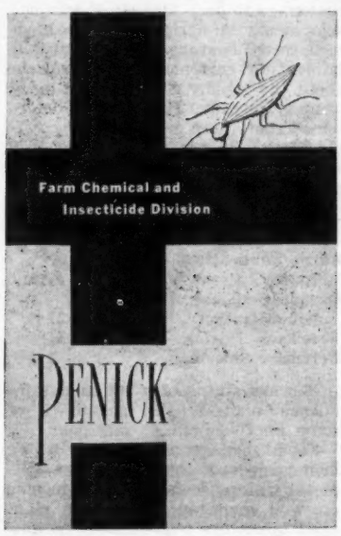
Warfarat, a rodenticide produced by Hess & Clark, is now being marketed in a new package size and design, the company announced. The



package is wider and taller and now weighs 1¼ lb. It incorporates the basic Hess & Clark colors of red, yellow and black. The 4 lb. size contains eight 8 oz. self feeders. Further details about the changes can be obtained by checking No. 7650 on the coupon and mailing.

No. 6957—Farm Chemical Catalog

S. B. Penick & Co. has issued a 40-page catalog covering the products of the company's farm chemical and insecticide division. Detailed information is presented on product applica-



tions and the company's research and production facilities are illustrated. Copies of the catalog are available by checking No. 6957 on the coupon and mailing to this publication.

COOL, MAN, COOL

SANTA MARIA, CAL.—When the contractors could not find enough jacks to lower a feed store here to its new foundation, they used ice blocks to do the trick. They put 17 blocks of ice, weighing 100 lb. each, under the store. As the blocks melted, the store settled easily onto its new foundation.

CHEMICALS

(Continued from page 9)

find nowadays, so the farm owner often has more physical work to do. The 50-lb. bags are much easier for the middle-aged man to handle.

The store also sells to many large plantation owners who request the fertilizer in bulk form. Usually the store loads the material at the mill and hauls it direct to the farm. By doing so, it avoids double handling and can make a nice profit.

"Most of our sales are to small farmers and suburban people," said Mr. Esterling. "This is a phase often overlooked by some owners who think everything is being sold in large quantities. By stocking good lines of feed, seed, farm hardware, garden and lawn supplies, the dealer can often sell the small farmer some item every week of the year."

Such a store must also become an information center if it holds business. The Davis Feed & Seed is such a place where farmers gather to discuss crops and new methods.

Another requirement is cleanliness and the proper displaying of items. The Davis Feed & Seed Store has all products departmentalized so the customers can serve themselves. Related items are placed close together to stimulate tie-in sales, and seasonal goods are usually displayed near the front where customers can see them.

To survive in an uptown location, the store must have all the cleanliness and order of the big super market or department store, plus the customer service in the form of advice and demonstration which the department store cannot give.

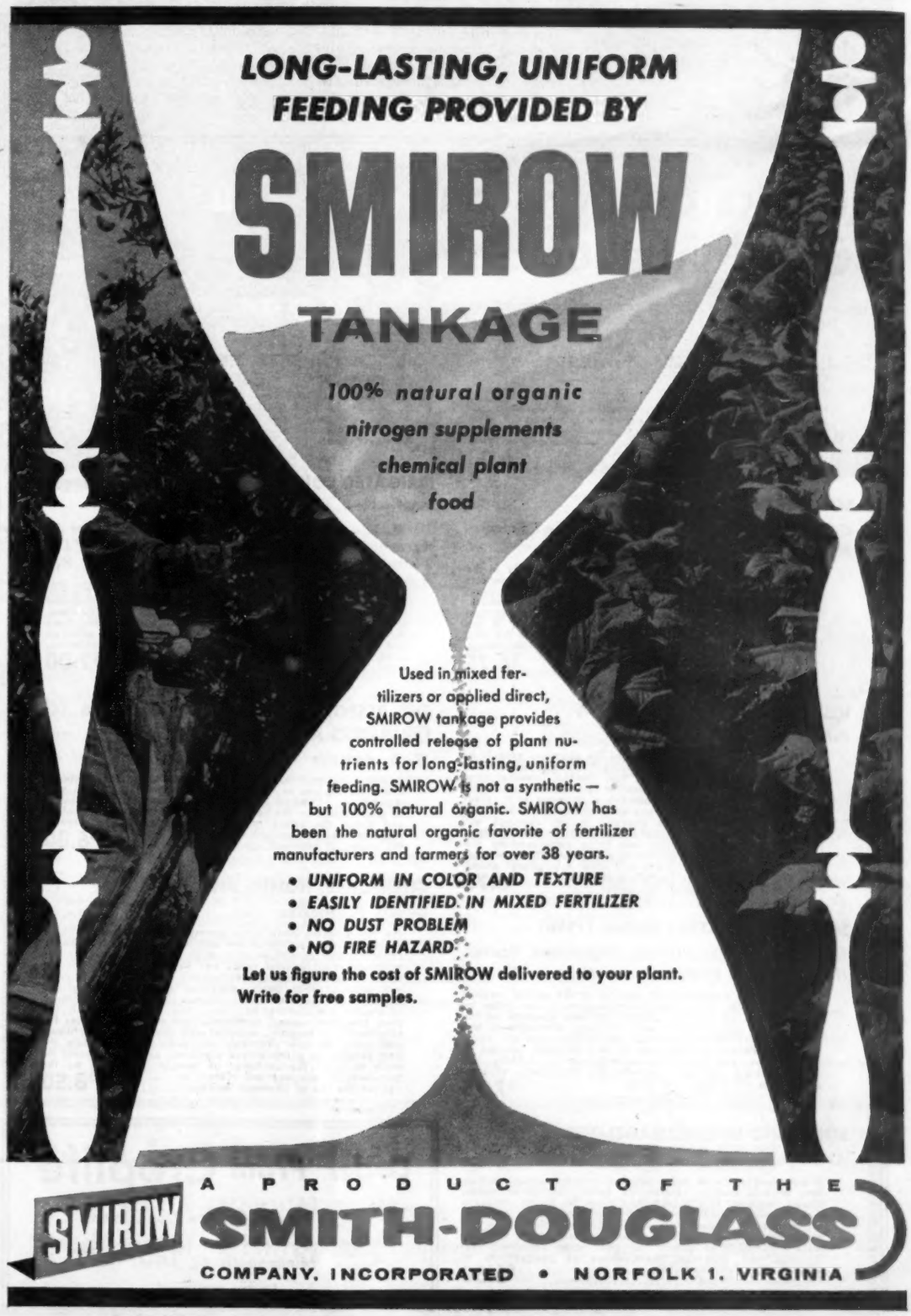
"We have not overlooked the town trade," said Mr. Esterling. "A lot of small packaged chemicals, garden seed and supplies are sold to town customers. Many of these sales are small, but the profit per item is much higher than on bulky purchases. And each item sold may make us a new customer who will continue trading here."

FARM LEADER DIES

PROVIDENCE, R.I.—Oscar R. Hallene, 64, president of the National Farm Owners Assn., died recently at a local hospital. Mr. Hallene was also a vice president of the National Farmers' Production Credit Corp.

ADDS NEW LINE

KENOSHA, WIS.—N. S. Koos & Son Co. here, manufacturer of plant foods and chemicals, has announced a new line of feed products called Royal Ribbon.


LONG-LASTING, UNIFORM
FEEDING PROVIDED BY
SMIROW
TANKAGE
100% natural organic
nitrogen supplements
chemical plant
food
Used in mixed fertilizers or applied direct, SMIROW tankage provides controlled release of plant nutrients for long-lasting, uniform feeding. SMIROW is not a synthetic — but 100% natural organic. SMIROW has been the natural organic favorite of fertilizer manufacturers and farmers for over 38 years.
• UNIFORM IN COLOR AND TEXTURE
• EASILY IDENTIFIED IN MIXED FERTILIZER
• NO DUST PROBLEM
• NO FIRE HAZARD
Let us figure the cost of SMIROW delivered to your plant.
Write for free samples.
SMIROW
A PRODUCT OF THE
SMITH-DOUGLASS
COMPANY, INCORPORATED • NORFOLK 1, VIRGINIA

Keeping Customers Sold Through Service

By R. W. SCANLAN*
Phillips Petroleum Co., Bartlesville, Okla.

Selling ability and reselling ability are one and the same thing. In brief, it involves applying experience and knowledge to the process of exchange.

Most of our activities involve selling principles. A teacher sells information, a preacher sells religion and a salesman who sells fertilizers, farm equipment, farm chemicals or hybrid seeds requires the same basic principles. How to present the wants and needs of a customer is our problem.

The qualifications of a successful salesman, in order of their importance, are considered to be as follows: character, industry, ability, courage and personality. Selling is like the art of hog calling. You must have appeal as well as power in your voice. You must make the hogs believe you have something for them. With farmers you must be sure you have something, because they remember we must meet a new set of conditions.

Half of the products sold to farmers today did not even exist 15 years ago. People are changing their buying habits in search of the new and better products. Therefore we cannot rest our sales punch completely on advertising appeal, promotional gimmicks, shaky credit terms, cheaper prices and the art of belittling competitors. The big difference will be, in the long run, the kind of relationship and service we build up with the customer. That's when our character as salesmen begins to show.

It is said that the most priceless advertisement in the world is the wagging tongue of a satisfied customer. You can't buy it nor demand it—you must earn it.

Consider the new developments in the fertilizer industry. Observe that they were devised by the industry to better serve the customer:

1. High analysis materials
2. Pelleted fertilizers
3. Plant food in solution form
4. Application equipment by air, soil and water
5. Agricultural ammonia — granddaddy of all nitrogen products, and the most spectacular in point of view of farmer interest, concentration of nitrogen and in growth.

As a general rule, the public is hostile to new ideas and new products. When steam was first used in transportation, the doctors passed a resolution to the effect that the passenger would be injured when hurled through the air at 30 mph, because his blood would stop circulating.

Morse faithfully showed his telegraph invention to 10 succeeding sessions of Congress before it received any serious attention.

When Westinghouse first said he could use air brakes to stop a train, the "experts" called him a fool.

McCormick talked about his new grain reaper for 10 years before he sold 100 machines.

Anhydrous ammonia, as we know, is a new product to farmers. In the process of introducing new ideas and products, we are usually faced with two situations. First, the fact that the progressive farmer is better educated, more traveled, a better judge of values and more independent in his buying habits. This underscores the most important qualifications of a successful salesman—character, being absolutely sincere and truthful, else our customers will mark us as a phony, with no hope of a resale.

Second, the future expansion of our sales of product will be in the great bulk of farm customs prospects who do not have the benefit of knowledge of new products. Their thinking has to jump from the Stone Age to the Jet Age. From the age of manure spreaders to the age of multiple types of fertilizer materials and application techniques.

We mentioned knowledge as an important factor in successful selling. We all have the obligation to get in tune with our experiment stations, extension specialist, county agents and other specialists.

Let's consider the challenge to our educators and to our industry by reviewing a recently completed survey of corn belt farmers indicating the educational level of the average farmer. Believe it or not—the survey shows that: 1. 20% don't know that alfalfa and sweet clover won't grow on acid soils. 2. 30% don't know that loam soil has more sand in it than clay and peat soils. 3. 45% don't know that the percent of slope is the number of feet drop per 100 ft. 4. 65% don't know that anhydrous ammonia is a high nitrogen fertilizer. Is it any wonder that the survey showed that of 1,000 grain belt farmers, one-third spent $5 per acre on fertilizing corn, less than 2% spent $20 per acre.

Many don't read, don't travel and don't attend short courses and meetings. They group together and pool their ignorance and are twice as ignorant after. Consider for a moment the fact that corn is the best customer nitrogen has. That may point to our measure of our industry in spreading the gospel of sound fertility usage. Are we too professional in our approach to the problem of getting and keeping new customers? Should we not learn the language of simplicity in our selling pitch, advertising, telephone conversation and letters? The forefinger is pointing at us—at our ability to carry the message.

As progressive industry members we have certain obligations to do a better job out ahead in assisting our customers to keep abreast of new developments in agriculture. We have to have the courage to speak out and inform our customers and prospects about the rapidly changing soil management picture. It has been determined that there are about 30 possible local influences on fertilizer use. How do we stand—what's our batting average as salesmen? Let's take a look at the results.

	Influence
Farm Publications and County Agent	47%
Observation and demonstration	21%
Fertilizer Dealer	11%
Fertilizer Salesman	1%

The low status of a salesman's influence suggests the possibility of some improvement on our part.

Farm management studies over long periods of time show that 75% of the difference in net farm income on well managed and poorly managed farms are management factors. Crop yields per acre was the most important one of all.

It has been pointed out that yield response data and increases in net return per acre are not the only factors useful in convincing farmers to use fertilizer. There are four yield levels a farmer can shoot for. 1. Maximum. 2. Highest net per acre. 3. Last money invested in fertilizer gives a return equal to investment elsewhere. 4. Highest return per acre invested in fertilizer.

In this area lies one of our greatest opportunities for service to advise our customers on the most profitable levels of nitrogen and other plant foods for the customers, not for us. It is

(Turn to SERVICE, page 15)

*From a paper presented at the Minnesota Nitrogen Conference, August, 1959.

Books on Soils and Soil Management

SOILS AND FERTILIZERS—Fourth Edition

Firman E. Bear

Covers in detail: soil chemicals, important soil elements such as nitrogen, phosphorus, calcium; yield prospects of crop plants, moisture control, soil management; mechanical operations; soil conservation; organic matter maintenance. New facts, accurate figures. 66 illustrations, 420 pages $6.00

SOIL FERTILITY (1955)

C. E. Millar, Professor Emeritus of Soil Science, Michigan State College

A fundamental treatment of the principles of fertility in the soil, with major emphasis on the plant itself. Relevant aspects of soil chemistry, soil physics, soil microbiology and plant physiology from viewpoint of their influence on plant growth. Each major plant food element and the more important micro-nutrients fully treated with respect to supply in the soil, sources and amounts of additions, losses from the soil, functions in plant growth and plant symptoms of deficiency. Covers all sections, with considerable space to saline soils and soils of southern latitudes $6.75

CHEMISTRY OF THE SOIL (1955)

Firman E. Bear

Presents a comprehensive picture of the chemical aspects of soils in relation to their development, present constitution and the uses to which they are put. Covers: chemical composition, soil, colloids, organic matter relationships, oxidation-reduction phenomena, acid, alkaline and saline soils, plant nutrition, nutrient fixation, trace element chemistry, root and soil relationships. Scientists engaged in soil research will find useful data directly applicable to their investigations. Food chemists, manufacturers and those manufacturing liming materials, fertilizers, soil conditioners, surfactants, wetting agents, insecticides, fungicides and other agricultural chemicals will gain new ideas for future product research and development. 384 pages $8.75

SOIL PHYSICS—Third Edition (1956)

Dr. L. D. Baver, Director Experiment Station, Hawaiian Sugar Planters Association

This represents a considerable revision of the earlier versions and incorporates many ideas communicated to the author by soil scientists all over the world. Two new chapters on the principles of soil irrigation and drainage, discussion on soil puddlability, effect of chemical soil conditions on soil structure, and recent contributions of the diffusion process in soil aeration, and information on hydraulic conductivity, soil moisture stress and plant growth, the importance of compaction on soil tillage, and wind erosion processes. 489 pages $7.75

SOILS AND SOIL MANAGEMENT

A. F. Gustafson

A complete study of soils; physical properties, soil, organism, organic matter, relation of water, control of water, tillage, erosion, acidity and its control by liming, management of alkali soils, nitrogen and its importance to the farmer, production, conservation and utilization of farm manures, production and utilization of green manure crops; fertilizer materials and their effects on soils; crop rotations; fertilization and long-term maintenance of productivity of mineral soils. Published 1941. 424 pages, illustrated $6.50

SOIL SCIENCE SIMPLIFIED

Helmut Kohnke

A concise textbook dealing with basic concepts of soils. Much useful information for students in agriculture, farmers, fertilizer salesmen, etc. 68 pages, paper bound $1.00

IRRIGATED SOILS: Their Fertility and Management—New 1954—Second Edition

D. W. Thorne and H. B. Peterson, Department of Agronomy, Utah State Agricultural College. Dr. Thorne is also Chief of Soils and Fertilizer Research Branch, Tennessee Valley Authority

An outstanding text dealing with the problems of irrigated regions. In addition to the chapters dealing with irrigation, the salt problem, reclamation of saline and alkali soils, there are chapters on maintaining organic matter in soil, minerals and plant growth, fertilizer elements and fertilizer materials, using fertilizers, soil management for general field crops, for fruit, vegetable and specialty crops... $7.00

THE RESPONSE OF CROPS AND SOILS TO FERTILIZERS AND MANURES (1954)

W. B. Andrews

A new book, with special reference to Anhydrous Ammonia and other sources of nitrogen in liquid form. Deals also with legumes as a source of soil nitrogen, and the uncertainty of green manures; the response of soil to phosphorus, potash and soda; the effect of fertilizers on yield and feeding value of hay and pasture crops. 468 pages, 19 chapters, 89 illustrations $6.00

CHEMICALS, HUMUS AND THE SOIL

Donald P. Hopkins

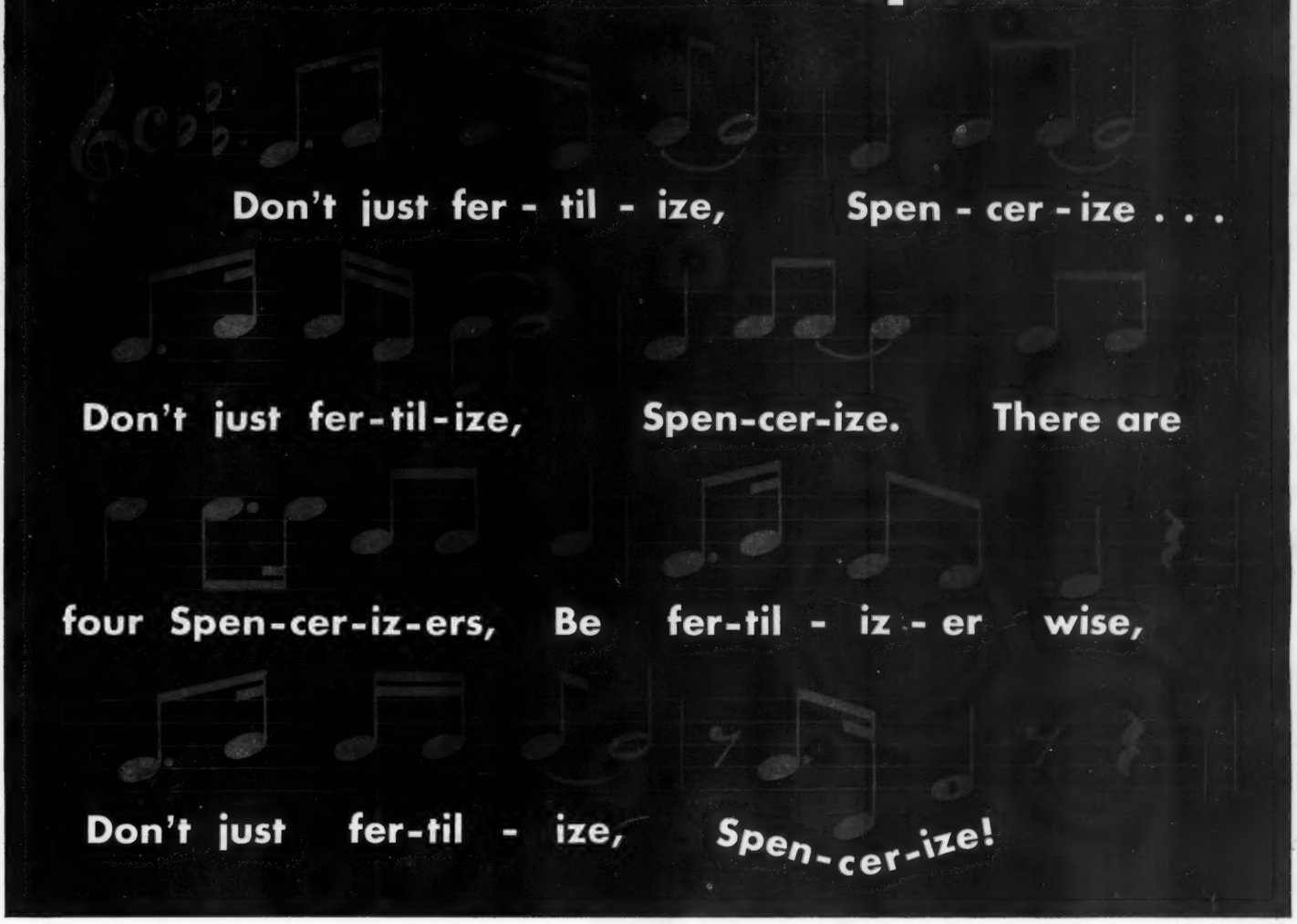
The theme of the book is the necessity of chemical fertilizers to maintain the fertility of the soil. It has concise information on which soil conditions and which chemical fertilizers are most suited for special crops and vegetables. Space is devoted to cereal crops, barley, wheat, oats and rye; to roots and tubers, sugar beets, potatoes, carrots, parsnips and turnips; to vegetable crops, beans, peas, alfalfa, lupines; to grasses and clovers; to onions, flax, kale, cabbages, lettuce, tomatoes, celery, cauliflower and fruits. It clarifies the relationship of manures, compost and chemicals as fertilizers and points out how chemicals should be used to obtain the best results. Its philosophical soundness and logic should do much to avert the confusion of thought introduced by the advocates of compost and manure as against the use of chemical fertilizers..... $8.50

Order From Croplife

Reader Service Department
P.O. Box 67
Minneapolis 40, Minn.

(enclose remittance)

Don't Just Fertilize . . . Spencerize


Don't just fer - til - ize, Spen - cer - ize . . .
Don't just fer-til-ize, Spen-cer-ize. There are
four Spen-cer-iz-ers, Be fer-til - iz - er wise,
Don't just fer-til - ize, Spen-cer-ize!

Now! Spencer Makes It Easier for You To Sell Spencer Nitrogen! Here's How:

It's easy for you to sell a product that people want. That's why Spencer Chemical Company has started an exciting new campaign to make more farmers want nitrogen—*Spencer* Nitrogen. Spencer "Mr. N" Ammonium Nitrate is already the leading brand of ammonium nitrate in almost all of Spencer's 28 states, and now all *four* Spencer Nitrogens will be under the same selling tent.

In the biggest campaign in Spencer history farmers will be told that, no matter what type of nitrogen they want, Spencer has it. They'll know that Spencer's complete line includes Spencer "Mr. N" Ammonium Nitrate . . . Spencer URA-GREEEN and ANA-GREEEN Nitrogen Solutions . . . Spencer Anhydrous Ammonia . . . and Spencer 45 Urea.

"Don't just fertilize . . . Spencerize"—that's the catchy theme of this Spencer campaign, and nearly every farmer in your trade area will be seeing it in leading farm magazines and hearing it on key farm radio stations. As you can see above, the Spencerizer theme has even been set to music.

A free record of this toe-tapping new Spencerizer song is yours for the asking. Just fill in the coupon at right and mail it to Spencer. By return mail you'll receive a full-length 45 rpm hi-fidelity recording by one of America's leading country music bands. The Spencer people think you'll enjoy playing this recording, and hope that this brand new Spencerizer campaign will help you sell more nitrogen — Spencer nitrogen.

Send for your FREE RECORD

Spencer Chemical Company
Dwight Building
Kansas City 5, Missouri

Gentlemen:

Please send me without charge or obligation your 45 rpm recording of "Don't Just Fertilize . . . *Spencerize!*"

Name_____

Company_____

Address_____

City_____ State_____

SPENCER

Don't just Fertilize . . . Spencerize

SPENCER CHEMICAL COMPANY, Kansas City, Missouri

Producer of 4 Nitrogen Spencerizers for hungry crops

FARM SERVICE DATA

EXTENSION SERVICE REPORTS

Ray LaVoie, who farms 358 acres near Clarissa, Minn., has been trying something a bit different on his alfalfa—annual nitrogen top-dressing.

To some farmers, this probably would sound like "taking coals to Newcastle." But Mr. LaVoie has good reason for it. As he puts it, "Soil tests show that my land is generally low in nitrogen. In fact, it seems as though it needs more than the alfalfa plants can actually supply. Where I've used the fertilizer, I've taken as much as four tons of hay per acre in one season—compared to three tons or less from unfertilized alfalfa."

Getting response from nitrogen on alfalfa is unusual. Although nitrogen application generally isn't recommended on alfalfa, University of Minnesota soils specialists are checking into the situation. They say that if it is thought that alfalfa needs extra nitrogen, farmers could start by fertilizing small strips as a check.

Mr. LaVoie applies about 100 lb. of 33-0-0 to his alfalfa in early spring—and usually tries to keep an alfalfa stand for four years. He's been using fertilizer to boost returns from all crops for almost 20 years—but tested soil for the first time last year. Now, though he's a firm believer in soil testing and will be testing several samples again this fall during the Minnesota Fall Soil Sample Roundup.

When Mr. LaVoie began fertilizing his oats according to soil test recommendations, he pulled down $2 to $3 extra return for every fertilizer dollar.

"On my oats, I used 200 lb. of 6-12-24—which I mixed myself here on the farm—per acre as a broadcast treatment. And it really produced results. I know that I got at least 30 bu. per acre more because of the fertilizer. One small field, for example, went about 100 bu.

"The fertilizer in this case cost about $6 an acre. And that investment must have returned itself at least two or three times in increased yield. That's only part of the story, too. I should get a better legume stand—and better hay yields next year."

He also fertilizes his corn heavily, but, again, based on soil test results.

★

Irrigating twice and putting down 500 lb. of 12-12-12 fertilizer at planting time has produced a record yield of 27 tons sugar drip silage cane on the Roy Turner farm near Sulphur, Okla.

The crop was planted on land on which 10 tons of rye and vetch an acre had been plowed under prior to planting.

"We estimate the cost of growing the silage crop at $31 an acre. We value the silage at $8 or more a ton as feed for our livestock," Mr. Turner said.

The crop was grown on Mr. Turner's 500-acre farm near the Turner Hereford ranch. Mr. Turner bought the farm three years ago, describing it as mostly worn crop land. It is located on Mill Creek, just below 4 Mill Creek retention dams which protect the farm from flooding.

Other crops on the farm also responding to fertilizer and irrigation are 150 acres of alfalfa ready for the fourth cutting that has averaged over a ton an acre for the three previous cuttings.

The alfalfa, planted last fall, has had six waterings during this year's growing season.

Mr. Turner has 201 acres of hybrid grain sorghum that is expected to yield 5,000 to 6,000 lb. an acre.

This crop was fertilized with 250 lb. of 6-24-24 at the time of planting in 16 in rows and has been watered two times.

★

Orson and Dillon Hempstead of Houston, Minn., this year paid $9 to have soil from 87 acres of their farm tested—and saved $286 by fertilizing according to soil test recommendations.

"Before we sampled our soil and had it tested, Dad and I guessed how much fertilizer those 87 acres should have—using past experience as our only guide," says Dillon, son in the father-son 296-acre farm operation. "Then Harlie Larson, Houston County soils agent, helped us sample our soil and worked out fertilizer recommendations after the University of Minnesota had tested the nine samples. If we had fertilized by guess—rather than by test—we would have applied phosphoric acid unnecessarily. In other words, we saved the equivalent of five tons of fertilizer."

The Hempsteads got their first soil test eye-opener about seven years ago when son John, now studying agriculture at the University of Minnesota, tested two samples of soil as part of a high school vocational agriculture project. Test results showed that the fields John had sampled needed about 150 lb. of potash per acre.

The Hempsteads had been using much fertilizer before that time and frankly admit that they "didn't believe the results of John's soil test." In fact, they asked Victor Johnson, former county soils agent, to re-run the test. Sure enough, the soil was deficient in potash.

"To correct the deficiency, we applied about 250 lb. of 0-0-60 per acre," says Orson, "and we switched from the 1-6-3 ratio fertilizers we had been using up to that time, to fertilizers with a ratio of 1-4-4."

Today, as a result of that switch in fertilizers, the Hempsteads seldom find potash-deficient soils on their farm.

"In our certified seed operation, we often have to maintain long-time alfalfa stands for isolation. And potash really made the job a lot easier," Orson says. "For example, six years ago when we seeded alfalfa on one field, we applied 200 lb. of 0-0-60 per acre. It got that alfalfa off to a good start. And by giving that field extra fertilizer every year, we are getting top-notch crops from that field yet this year."

When the Hempsteads say top-notch crops, they mean it. This year's first cutting on the six-year alfalfa stand yielded 120 bales per acre. Last year, as part of their green-chopping program for their 60-cow dairy herd, they took five cuttings from the field.

"Heavy fertilization is the key to getting that kind of production from alfalfa, though," Dillon says. "At least once every season we top-dressed that field with 0-12-36. And last year we applied about 120 lb. of the same fertilizer after three of the five cuttings."

Although the Hempsteads don't fertilizer all their hay and pasture that heavily, they get high-level production from other fields. Last year, they carried 130 head of cattle on 21 acres—in spite of dry weather.

Corn production on the Hempstead farm is nothing to scoff at, either. Yields have averaged 100 to 110 bu. per acre during the last five years. Here's how they get that kind of production: In spring the Hempsteads chop stalks; apply nitrogen and potash according to test; plow; then plant the corn in the tractor wheel tracks using 80 lb. of 12-12-12 per acre as starter. Danger of floods makes fall plowing risky in the Root River Valley where Hempsteads farm.

"Three years ago we traded four-row corn farming for two-row wheel-track planting," says Dillon. "That way we were able to cut width between pairs of rows to 34 in.—one of the things that helps us keep our population between 18,000 and 20,000 plants per acre. Then fertilize according to soil test—hope for good weather, too—and we usually come out well at harvest time."

Other enterprises on the Hempstead farm are also carefully-planned, modern operations. But Orson and Dillon are quick to emphasize that fertilizing according to soil test is the key to all-round profits on their farm. They're staunch supporters of Minnesota's Fall Soil Sample Roundup now under way.

Orson sums it up like this: "Soil testing is as important as cow testing in this business of farming. We learned that you can't afford to milk cows without testing years ago. Now we've learned the same lesson about crop farming and soil testing."

★

A good idea comes from the Service Feed & Hardware Store in Beaumont, Texas, which says they remodeled their store and placed sliding doors along the entire left side, which in fact puts the entire store on display.

The doors are the overhead type such as used in garages.

Because that section of the country enjoys more than eight months of warm weather each year, the open air idea is very popular.

The doors have proved useful in other ways, too, because they eliminated the need of placing merchandise outside for sidewalk displays, every section of the store can be seen from the sidewalks and most of the merchandise is visible to passersby.

FREE SOIL TESTS

YAZOO CITY, MISS.—According to Walter White, Yazoo County agent, farmers can now get soil tests made without charge at his office. The service was made available through cooperation with the Yazoo County Farm Bureau. Formerly such sample tests had to be sent to Mississippi State College.

what's NEW?

Broyhill No. 8 Transfer Pump

A complete unit for transferring liquid fertilizers 100 gal. per minute. Self-cleaning, non-clogging. Centrifugal pump coupled to engine on carry-stand. Write for complete details, prices and delivery date, to:

the Broyhill COMPANY DAKOTA CITY, NEBRASKA

GOLDEN RULE

(Continued from page 9)

him expand his business. One of the speakers listed several points concerning the philosophy of customer relations. Mr. Hubbard revised these points to fit his own business and had them painted on a sign and installed above the door in his store. The sign reads:

"TO OUR CUSTOMERS—Our customers are the most important persons in this business. Our customers are not dependent on us, we are dependent on them. Our customers are not an interruption to our work, they are a purpose of it. Our customers are not outsiders to our business, they are a part of it. Our customers are not bold statistics, they are flesh and blood human beings. Our customers are persons that bring us their wants. It is our job to handle them and at all times be aware of the fact that we are their servants. Our customers deserve to be treated as guests and to be treated courteously at all times, and it is our duty and responsibility that this be done. All of us at Panola Seed and Feed Company are aware of these things and promise our customers that we will always be aware of them."

"Do you really mean everything on that sign?" a customer asked. "I told him I did," Mr. Hubbard said. And the firm's record of personal service bears him out.

Like other dealers in this area Mr. Hubbard has discovered the advantages of a well displayed line of garden supply merchandise. "We're selling more and more garden seed every year as well as plant food, insecticides and gardening equipment. I work with the Batesville Garden Club as closely as I can," Mr. Hubbard said. "The interest created by this group has meant a significant increase in business for me. I not only help with technical information but I do things like donating prizes of garden supplies for the club's annual show."

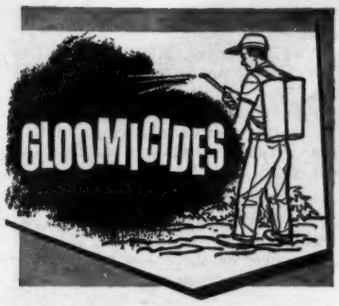
About his plant food business Mr. Hubbard said, "Fertilizer means more dollars to me than anything I sell. We do a high volume business both in solid nitrogen and in mixed fertilizers."

He believes that an alert fertilizer dealer can beat the threat of direct selling simply by offering service. "A few farmers that have warehouse space on their farms are buying fertilizer direct," he said. "But by far, most of the farmers don't want to be troubled with storing and moving fertilizer several times before using it. They know that I keep a big supply on hand and all they have to do is drive by when they need it or just call me and I'll deliver it to them." He added that the support of his suppliers in keeping fertilizer prices competitive has been a big help in combatting direct selling and co-op store competition. "But service is the final answer," he concluded.

The sale of lime is another big plus in Mr. Hubbard's profit picture. He started handling lime about six years ago and does fall and spring business on a contract basis. He estimates that about 75% of the pasture and row crops in his area is limed.

The firm is housed in a modern brick building with a connecting warehouse. The salesroom measures 40 by 70 ft. and is glassed on two sides. The warehouse contains another 4,000 sq. ft. Mr. Hubbard has one sales clerk assisting him and three laborers. Additional labor is hired during the busy seasons.

Looking back over the past 13 years of steady growth, Mr. Hubbard commented, "I have tried to build the business around personal service, I thought it would pay off. We'd say that it has, definitely."



A neurotic is a person who builds castles in the air. A psychotic is someone who moves into them.

★

On a certain island in the South Pacific there are no taxes, unemployment, crime, beggars, jazz bands, TV or inhabitants.

★

The employment manager was interviewing a man who claimed to be a skilled mechanic. The personnel man explained that the opening required a really experienced mechanic. Whereupon the job applicant casually mentioned that he had worked for twenty years as a mechanic at a gigantic automobile plant. The interviewer was impressed.

"Exactly what did you do?" he inquired.

"I tightened Bolt 734-853A on Assembly 839-412," was the reply.

★

"He's out to lunch now," the secretary informed the phone caller, "but he won't be long; nobody took him."

★

Social tact is the art of making your guests feel at home, particularly when you really wish they were.

★

Science tells us people are taller in the morning — but everyone knows some people who are higher at night.

★

Young Steve's first four months at kindergarten apparently had widened his horizons considerably, so his mother thought it would be interesting to inquire about his current loyalties.

"Honey," she said, "whom do you love the best?"

Soberly he considered the question and then replied. "Well, I love you best. And then comes Daddy. And teacher is last. But in between comes a lot of dogs."

★

After a woman has parked her car, the big problem is which of three parking meters she should put her nickel into.

★

Funny, isn't it—how it takes about 20 minutes to introduce the man who needs no introduction.

★

What could be sadder than a man without a country!

A country without a man!

★

Women are to blame for most of the lying which men do. They insist on asking questions!

★

Fortune Teller: "Prepare yourself —your husband is about to die a violent death."

Wifey: "Will I be acquitted?"

★

Chilled by a breeze through the Pullman car, the young woman in the upper berth attracted the attention of the man in the lower berth.

"Will you get me a blanket?" she demurely requested. "I'm cold."

"Are you married?" the man asked.

"No, I'm not married," the girl replied.

"How would you like to play that you were married?' he enquired.

"Oh! I think that would be fun."

"Then go get your own blanket."

★

Don't tell your friends about your indigestion: "How are you!" is a Greeting, not a Question.

★

An angry little man bounced into the postmaster's office. "For some time now," he shouted, "I've been receiving threatening letters, and I want something done about it!"

"I'm sure we can help," soothed the postmaster. "That's a federal offense. Have you any idea who is sending you the letters?"

"Indeed I have!" snapped the little man. "They are all coming from those income tax people."

★

Kissing is just so much chemistry. It has to do with a craving for salt. The cave man found that salt helped cool him off in the summer. He found, too, that he could get salt by licking his neighbor's cheek. Also that it was more interesting if the neighbor was of the opposite sex.

★

Baldheaded Gent: "You ought to cut my hair cheaper. There's so little of it."

Barber: "Oh, no. In your case we don't charge for cutting the hair, we charge for having to search for it."

★

"That's guy's a psycho-ceramic."

"What's that?"

"A crackpot."

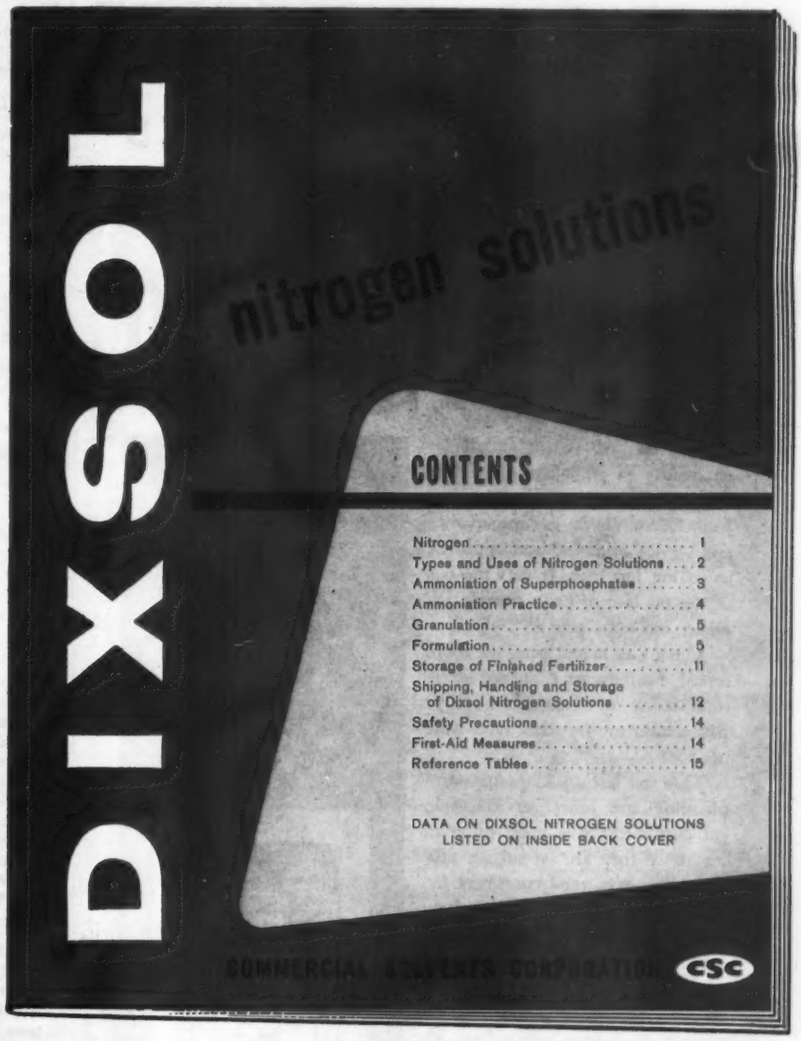
SERVICE

(Continued from page 12)

recommended that all salesmen have the courage to keep spreading the doctrine of sound soil management principles in our selling. If the industry is fuzzy in its thinking and tends to beat about the bush on its advice to our customers on the use of nitrogen, and our sales level off, then the moral is, "If we run around in circles we can't complain because the scenery becomes monotonous."

If we know why customers leave we should know how to keep customers sold. Here is what the airlines say about losing their customers: 1% die, 3% move away, 5% business friends, 9% price, 14% grievances and 68% indifference.

If we fail to keep 82% of our customers because of grievances and indifference, would we not be wise to improve our handling of complaints, and pay more attention to our customer so he will not think we are indifferent. Let's remember that a customer bruises easily, but doesn't heal quickly.


DIXSOL
nitrogen solutions
CONTENTS
Nitrogen 1
Types and Uses of Nitrogen Solutions ... 2
Ammoniation of Superphosphates 3
Ammoniation Practice 4
Granulation 5
Formulation 5
Storage of Finished Fertilizer 11
Shipping, Handling and Storage of Dixsol Nitrogen Solutions 12
Safety Precautions 14
First-Aid Measures 14
Reference Tables 15
DATA ON DIXSOL NITROGEN SOLUTIONS LISTED ON INSIDE BACK COVER
COMMERCIAL SOLVENTS CORPORATION
CSC

NEW! DIXSOL® NITROGEN SOLUTIONS BOOKLET

Here's a new and convenient guide that should be in the hands of every fertilizer production man. As you can see from the contents listed on the cover, it's packed with information and data. And it's designed to assist you in your production planning and problems. If you have not already received a copy, write today.

MAIL THIS COUPON FOR YOUR FREE COPY!

Agricultural Chemicals Department
COMMERCIAL SOLVENTS CORPORATION
260 Madison Avenue, New York 16, N. Y.

Please send me a free copy of the new Dixsol Nitrogen Solutions Booklet.

Name_____
Title_____
Company_____
Address_____
City_____ Zone____ State_____

OSCAR & PAT

By Al P. Nelson
Croplife Special Writer

The telephone rang in mid-morning that Thursday and Tillie Mason, the plump, ulcerish bookkeeper, answered. "No, Mr. McHale, Pat isn't in here now. He went with the bulk truck driver to help spread some plowdown fertilizer at the Harkness farm eighteen miles out. I'll bet he forgot all about checking that press proof on the ad in this week's paper."

At the word "ad" bald headed, pot bellied Oscar turned around quickly in his swivel chair. "Adt?" he said. "Press proof? Ach, are we runnink another one this week? We ran one three weeks ago. Let me talk to that McHale."

He got on the phone and told Mr. McHale a few things about the expensiveness of advertising. When McHale told him he had orders from Pat to run the ad and it had to be okayed in a half hour so as not to tie up the presses, Oscar told McHale he would be down and look it over.

The figure of determination, head down, lips tight and swinging his arms, Oscar strode down the main street of the town to the office of the local newspaper, the Tell City Gazette.

McHale, a tall, lean man who wore pince-nez glasses looked frostily at Oscar, and pointed to a wet press proof on a desk. "There it is!" he said. "Don't make too many changes. There isn't time. Besides if you change more than 10% of the copy we'll have to charge extra."

Oscar took one look at the press proof. "Ach, a whole half page! Is that Irisher crazy? Why does he always take such big space? Two inches wouldt be enough, maybe twice a month."

"Two inches!" echoed the shocked McHale, a firm believer in sizable, consistent advertising. "They would not see such a small ad."

Oscar let out a roar like a wounded elephant. "A combination sale!" he bellowed. "Ach du Lieber . . . A wheelbarrow, a leaf rake, a bag of lawn fertilizer, a hedge clipper and 5 lb. of lawn seed—all for only $27.25 and he gifs them free a barbecue outfit and a bird house."

Oscar was so shocked he sat down and wiped his brow. "Send that Irisher to the insane asylum! He has gone oudt of his head."

"It's a wonderful idea," McHale said. "People are aching to fix up their lawns. This combination order is a sales builder. People get the free barbecue outfit and a birdhouse, too. Combination offers have been selling for other merchants, too."

Oscar glared and read further. "Free wieners at the store all day long during this sale!" he howled. "More schtuff he gifs away. Throw oudt the adt, McHale. Throw it oudt. We don't want it."

The publisher's face grew white. "Mr. Schoenfeld," he said sternly, "this has gone too far. I'll throw out the ad but you fellows will have to pay for the cost of setting up the type. And it will be plenty. Compositors don't work for peanuts these days. They—"

The door opened and a breathless, perspiring , hatless Pat McGillicuddy came hurrying in.

"Throw oudt the adt," Oscar echoed. "Andt we won't pay for the type either."

"Wait a minute," Pat said haltingly, as he tried to get his breath. "Oscar, I don't supervise every discount you take on bills. I'm supposed to have the freedom on advertising and promotion. This promotion is going through. McHale, I'll check the ad and then you can run it."

"We will lose money, McGillicuddy!" bellowed Oscar. "Let us schtick to sellink fertilizer at regular prices. We are not a department store. First thing I know you will be tryink to sell groceries, too."

Pat's face grew grim. "Now you listen to me, Oscar. Perhaps you are a whiz at figuring discounts and watching costs, but you know absolutely nothing about advertising, promotion and marketing trends."

"Ach, I don't want to know anything about them," Oscar put in sharply. "You chust waste money with all that fancy schtuff. We got the fertilizer. They know it. Let them come and buy it at full price and for cash. What's wrong with that?"

"Nothing is wrong with that policy, Oscar, but it doesn't go far enough. You can't get enough customers that way. You have to tease customers to buy through advertising, display and special offers. You have to bring things to their attention. They really need all those things we've got in that combination offer. All we got to do is make them realize they need them."

"You are crazy, McGillicuddy. The heat has gone to your headt. We make some profit on sellink fertilizer at regular prices and then you go and spendt the profit on more promotion ideas. Stand still once in a while and rest your rump!"

"You can't sit still nowdays in this competitive age, Oscar," countered Pat heatedly. "You have to stay on the move, or the other fellow will get your business."

"Pat," said the nervous publisher, "won't you please proof read this press sheet? It's almost time for us to print, and if there are changes to make—"

"Just one minute more," Pat said wearily. "Oscar, I bought 50 barbecue sets dirt cheap at a bankrupt sale in Milwaukee the other day. And I can get 50 more if we need them. And the guy threw in 125 cheap birch bird houses. We make full markup on all those items listed in the combination ad. It's a deal for us."

"Ach, you will haf 50 barbecue sets on your handts!" snapped Oscar. "Nobody will buy them."

"We sell fertilizer only in spring and fall," Pat explained. "What are we gonna do the rest of the year for money? We have to develop other lines. Our garden and lawn lines have partly filled the gap. Now we may go into the barbecue stuff, too, to ease any slump. We have to get known as a garden and lawn and barbecue headquarters as well as a big bag or bulk fertilizer house."

"Pat," pleaded the tense publisher, "you've got ten minutes to okay that press proof!"

"Go aheadt and run your crazy adt if you must," shrieked Oscar. "Andt what you lose for us, I will take off your salary next Saturday."

"You wouldn't dare!"

"Ach, I will!" And Oscar went out, slamming the door.

"Well?" said McHale looking at Pat.

Pat hesitated only for a moment. "I've taken a lot of chances in my life, so I might as well take this one, even if I don't eat next week. I'll have that press proof okayed for you in two minutes, Mac."

MY FERTILIZER SALES INCREASED 55%

"I have set myself up on quality . . . quality mixed fertilizer and a quality nitrogen . . . John Deere Vitrea. For me, quality and service offer the best approach to selling fertilizer. It gets me out of the rat race of price cutting . . . makes me more profit.

"Quality products bring me more repeat business and at the same time many new customers. This past season my fertilizer sales were up 55%.

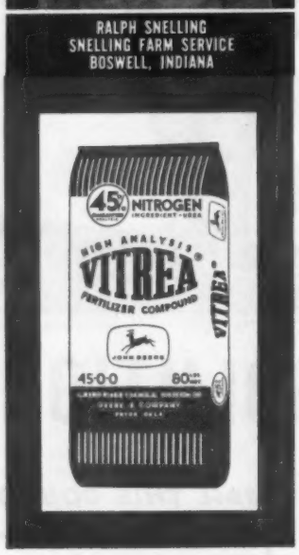
"Our soil testing, mapping, farm planning and other services help get customers on a good program . . . once they are on such a program they stay *good* customers.

"Some of the things I particularly like about handling Vitrea is the excellent service I get on deliveries — furthermore I know I can consistently depend on getting highest quality. And too, Vitrea bags always arrive in good shape with less breakage than other types I have previously handled.

"You can bet Vitrea will play a big part in my profit picture again this year."

RALPH SNELLING
BOSWELL, IND.

RALPH SNELLING
SNELLING FARM SERVICE
BOSWELL, INDIANA



With **John Deere** ViTREA — 45% nitrogen from urea — you can depend on getting the quality and service that is sure to please your customers and boost your profits.

TODAY, ViTREA IS A BETTER BUY THAN EVER!
ORDER NOW!

JOHN DEERE

SALES POINTS

Five points helpful toward more effective professional selling are listed by William Tobin, an official of the American Can Co. They are:

1. Never get so keyed up about making your point that you reveal your anxiety about making the sale.

2. Place a rein on your enthusiasm. Every customer will have his say even if it is at the expense of your sale. Don't top him. Don't belittle the value he places on his thoughts.

3. You don't have to answer every objection with a proof story. Trivial objections can be passed up. Untrue statements can be met with facts.

4. A considerate attitude for the customer's words will develop a friendly listening for your own.

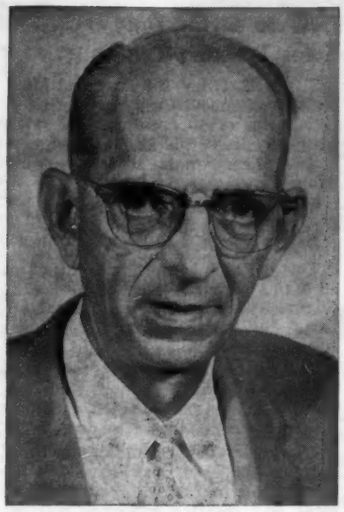
5. Try relaxing and listening to the customer.

PILOT KILLED

SENATOBIA, MISS. — Charles Breazeale, 21, was killed when his spray plane hit high tension wires about four miles west of here. Mr. Breazeale, owner and operator of his own spray service, was defoliating cotton when the crash occurred.

WINS SCHOLARSHIP

FT. COLLINS, COLO.—Allen McRay Wilson, of Colorado Springs, has been awarded the Colorado Agricultural Chemicals Assn. scholarship for the 1959-60 school year at Colorado State University.



Otis W. Allen

NEW APPOINTMENT — Otis W. Allen, a 29-year employee of International Minerals & Chemical Corp., has been appointed research specialist in the company's research, engineering, and development division, with offices in the Florida Experiment Station in Mulberry, Fla. Mr. Allen will concentrate on techniques toward producing higher analysis plant food materials and will serve as the division's expert on phosphate technology. He will report directly to the vice president of the research, engineering, and development division. Mr. Allen has been associated with the Bonnie, Fla., chemical plant since 1950, when he was placed in charge of coordination of planning, engineering, and construction.

Florida Vegetable Growers Study Marketing Problems

MIAMI BEACH, FLA.—"Agriculture at the Crossroads" was the theme of the recent 16th annual convention of the Florida Fruit and Vegetable Assn. here. Subjects covered at the sessions included talks on transportation, legislation, labor, foreign competition and marketing.

Among awards presented at the meeting was one to Dr. Gaylord M. Volk, soils chemist at the agricultural experiment station, Gainesville, for his work in discovery and remedy of a nutritional leaf roll disease of potatoes, tomatoes, peppers and egg plant.

B. E. Adams

ELECTED PRESIDENT — B. E. Adams has been elected president of Sunshine Plant Food Co., Clovis, N.M., with executive offices in the Exchange Bank Bldg., Dallas, Texas. E. F. (Bud) Williams of Clovis, former president, was named chairman of the board, and Jamie F. McFarland, Dallas, was elected secretary-treasurer. Mr. Adams joined Sunshine as executive vice president in June, 1958.

SMALL INVESTMENT PAYS OFF BIG

OZARK, ARK.—Wayne Hudson of Ozark, a Franklin County dairyman, has "positive proof" that a small investment in fertilizer pays big dividends.

For only $6 per acre, Mr. Hudson received excellent results in the establishment of pastures. And he credits fertilizer with providing that little extra margin of production.

Last fall Mr. Hudson wanted to pasture some of his expanding herd of beef cattle on an old farm which had been row cropped for years. But he wasn't sure the native pasture—dog hair, crab grass and other low quality early spring plants—would provide the grazing he needed.

So he sowed 20 lb. of rye grass per acre, applying 15 lb. of nitrogen, 30 lb. of phosphate and 15 lb. of potash in an effort to have enough winter and early spring pasture for his stocker cattle.

He got these fertilizer requirements by applying 150 lb. of 10-20-10. Mr. Hudson says the fertilizer gave the rye grass an excellent start, carrying it through the cold months when it furnished plenty of grazing for his cattle.

Mississippi Youth Produces 242 Bushels Corn on One Acre Demonstration Plot

BOONEVILLE, MISS.—The single acre demonstration of corn on the Ratliff farm in Prentiss County here yielded 242.37 bu. this year.

It was grown and harvested by Lindon Ratliff, a 4-H Club member and younger brother of Lamar Ratliff, whose 304.37 bu. from one acre in 1955 is considered a world's record.

Although still 62 bu. short of his brother's record, Lindon has increased his yield by 15.38 bu. over the figure he reached in 1958.

This yield is announced by W. T. Smith, county agent, and J. W. Archer, assistant county agent, both of Booneville. Led by Mr. Archer and assisted by his parents, Lindon has used much the same methods for two years. These are similar to those his brother used.

During the fall and spring he broadcast 50 wagon loads of barnyard manure, disking it into the soil.

The commercial fertilizer was 700 lb. of 14-14-14 and 700 lb. of ammonium nitrate placed before planting. When the corn was knee high, he side dressed it with 300 lb. 14-14-14 and 300 lb. ammonium nitrate.

He planted 1 bu. of Funks G-711. This was in 30 in. rows with spacing 6 to 8 in. in the drill.

Lindon cultivated this corn twice. Rainfall was sufficient; so he did not irrigate it.

Weed Control, Fertilization To Highlight 1960 Pasture Program in Mississippi

STATE COLLEGE, MISS.—Mississippi's 1960 pasture program will concentrate heavily on weed control and fertilization, announced W. R. Thompson, extension agronomist.

"We learned long ago on permanent and temporary pastures that we get much more grass over a longer period when the pastures are properly fertilized and the weeds controlled," he said.

For permanent pastures, he continued, soil testing is the best basis to depend on in finding out how much potash, phosphate and lime are needed. "Lime pays," said Mr. Thompson, "even if a farmer applies the needed phosphate and potash but omits the needed lime, pastures are not as good as they would be if lime had been added."

The agronomist noted results from spraying bitterweeds and dock. "Several farmers have told me that where they sprayed bitterweeds for two or three years, little or no bitterweed showed up in pastures."

"Dock areas sprayed last winter are still free from dock. Skipped areas in these fields have dock on them 8 to 10 in. high," he added.

Mr. Thompson said, "The cost of spraying pastures with chemicals for weed control is cheap compared with the good it does."

Regional Credit Manager

RICHMOND, CAL.—The appointment of John W. Cooledge to the newly-created position of regional credit manager—south, was announced by Charles M. Stutfield, manager of Calspray's credit division. Working out of the Atlanta regional office, Mr. Coolidge will administer credit and collection activities for the company in the southern region. California Spray-Chemical Corp. is the manufacturer of the Ortho line of insecticides, fungicides, and weed killers.

STOCK PURCHASE PLAN

MIDLAND, MICH.—The Dow Chemical Co. announced a price of $68 per share on an issue of 120,000 shares of its common stock to be offered its employees and those of its subsidiaries and certain associated companies. The price of Dow stock at the close of the market Sept. 29 was 80⅝; the high 80¾; low 79¾. Approximately 29,500 employees will be eligible to subscribe for stock on a payroll deduction basis under the 1959-60 Employees' Stock Purchase Plan.

A. C. Ogden H. R. Quimby

THE CHASE BAG Co., New York, has announced that A. C. (Chad) Ogden, sales manager of its Kansas City branch since 1956, has been appointed special representative in the Kansas City area. He has been succeeded as sales manager by H. R. Quimby, a sales representative for Chase in the same territory since 1946. Mr. Ogden joined Chase in 1940 and prior to coming to Kansas City was connected with its branch in Dallas. Mr. Quimby joined Chase at Kansas City shortly after World War II as a sales representative.

FOREIGN VISITORS

WASHINGTON—A number of distinguished foreign visitors were present at the symposium on insect resistance held here Oct. 7-9. Dr. Paul Mueller, Geigy Co., Basle, Switzerland, awarded the Nobel prize in 1948 for his discovery of the insecticidal properties of DDT, was present with Dr. George Ferguson, president of Geigy Agricultural Chemical Co., Ardsley, N.Y.

Speakers on the program from outside the U.S. included Dr. A. W. A. Brown, head of the department of zoology, University of Western Ontario, London, Canada; R. Milani, University of Pavia, Italy, and W. E. Ripper, Dow Agrichemicals, England.

THE Pak-Master LINE

MODEL 100 DUAL PURPOSE LIME & FERTILIZER SPREADER

THE SPREADER DESIGNED & ENGINEERED BY ACTUAL FIELD EXPERIENCE AND LIME AND FERTILIZER HAULERS THROUGHOUT THE COUNTRY

Convenient hand crank adjustment on feedgate allows regulating material flow from ground level.

50° sloping sides feature taper from front to rear of body which allows proper distribution on truck axles. Full radius on top edge for strength and longer tarp life. 50° side slope along with wide conveyor chain assure self-cleaning and eliminate bridging of material.

34" wide steel conveyor drag chain is light in weight and strong in tensile strength driven by 12 tooth steel drive sprockets. More contact with chain eliminates jumping of chain.

Heavy duty distributor fan assembly housing and extra strong triple gear case drive arrangement eliminates all chain and sprockets. The fan assembly is designed for wide spread application and a normal spread application. Complete assembly is adjustable or easily removed.

Large heavy duty conveyor drive gear case utilizes a 2" high tensile steel drive shaft with a 50:1 gear reduction (bronze gear and steel worm) for long life.

MODEL 100 SPREADER'S ADDED FEATURES

1—Box winged multiple strength side supports eliminate corrosion problems, add strength and are mounted flush with bottom sills.

2—20" distributor disc with specially designed fan blades enables normal spread or wide spread applications.

3—Removable and replaceable wear plates on return side of conveyor chain.

4—Bottom sills mount flush with truck frame to give added strength and longer life to spreader.

5—Body is of all steel welded construction.

6—Two-speed double output shaft transmission is cab controlled. Gives high R.P.M. on fans for wide spread and low R.P.M. for normal spread and maintains constant speed on conveyor.

7—Full width feedgate allows control of material flow to distributor fans.

8—Available in 10', 12' and 14' sizes.

Please send me information on the new Model 100 Dual Purpose PAK-MASTER Lime and Fertilizer Spreader:

Name .....

Company .....

Address .....

City ..... State .....

WHEN YOU OWN A Pak-Master YOU OWN THE VERY BEST

GADDIS BROS. MFG. CO., INC., Walford, Iowa

Ammonia Losses Observed After Surface and Shallow Application, Low Pressure Nitrogen Solution

By L. S. Robertson and C. M. Hansen
Departments of Soil Science and Agricultural Engineering
Michigan State University
East Lansing, Mich.

NITROGEN FERTILIZER SOLUTIONS can be grouped into two classes: non-pressure and low pressure. Low pressure solutions are usually composed of anhydrous ammonia and ammonium nitrate or urea. Such solutions frequently have a higher nitrogen content than non-pressure solutions. Because the solutions contain anhydrous ammonia, pressure up to 25 lb. sq. in. is developed, the amount depending on the quantity of ammonia present and the temperature of the solution.

Very precise recommendations are made regarding the use of such materials. The usual recommendation is to apply the material two or more inches below the surface of the soil. Manufacturers of low pressure solutions say that no significant loss of ammonia through evaporation occurs if this recommendation is followed.

Despite such advice, numerous inquiries have been received on the practicality of spraying or dribbling such solutions on the surface of the soil. Because surface applications are easier to make, some users report that they would be willing to sacrifice a small amount of nitrogen if the losses from such materials were not great. The purpose of the work presented here was to determine the extent of losses of ammonia nitrogen to the atmosphere from surface applications of low pressure solutions.

One phase of the investigation included studies at five locations with three rates of nitrogen application, 25, 50, and 100 lb. nitrogen an acre. Measurements of losses were made at time intervals of 25, 50, 100, 200, and 400 minutes after application by the dribble method of a low pressure solution containing 41% nitrogen. (The fertilizer was manufactured from anhydrous ammonia and ammonium nitrate. It contained 18.26% volatile ammonia nitrogen.)

These tests were conducted on three soil types. The field at the Conover loam location had been planted to corn. The soil was dry and crusted. Losses from the Hillsdale loam were measured under three conditions: (1) dry and granular (recently planted to wheat), (2) dry and crusted (corn field), and (3) wet and crusted (corn field one day after approximately a 3-inch rainfall). Measurements at the Kalamazoo sandy loam location were made in a corn field in August and the soil was dry and crusted.

The second phase of the investigation included studies on four soil types with varying characteristics in regard to reaction, texture, organic matter, moisture level, and physical status. Measurements of ammonia losses were made at the end of a 400-minute period.

The effect of time and rate of application of low pressure nitrogen solution applied by the dribble method to the surface of several soils on ammonia losses is shown in Table 1. Losses of ammonia occurred in every trial and were approximately proportional to the quantity of nitrogen applied. Losses were greatest or most rapid immediately after application. Losses at the Kalamazoo sandy loam location were significantly higher than at the other locations and represented approximately one hundred percent of the volatile nitrogen originally present in the solution.

The effect of several soil conditions on the ammonia lost from surface applications of low pressure solutions is shown in Table 2. Losses of volatile nitrogen to the atmosphere occurred in every trial. The reasons why losses occur are not easily determined. Losses within the Kalamazoo sandy loam soil type were variable. Even greater variations within this soil type occurred than between different soil types.

Notes were made at study time on the relative moisture content of the soil. Losses of ammonia were not directly associated with the various moisture levels.

The physical condition of the surface soil varies greatly during the growing season. Two broad classes of conditions were recognized: granular and crusted. Losses were not directly associated with the physical status of the surface of the soil.

Losses within this study were not directly related to soil reaction.

Theoretically, soils with higher clay contents have the ability to absorb more ammonia nitrogen than soils with low clay contents. This was not demonstrated by these studies because ammonia losses were not directly related to the texture of the soil.

Organic matter has the ability to absorb large quantities of nitrogen. Soils with the highest organic matter contents had lower loss rates than soils with low organic matter contents.

At each of these locations nitrogen solutions were injected into the soil to a depth of 2 inches. Losses were measurable in only three of nine trials where the solutions were injected to this depth. Even those losses were not economically significant in that they were 0.4, 0.9 and 1.7 lb. an acre, respectively, for the first three Kalamazoo sites shown in Table 2.

In summary, a low pressure nitrogen solution was dribbled on the surface of soil at rates of 25, 50, and 100 lb. nitrogen an acre at several locations. Losses of nitrogen to the atmosphere varied between 63 and 100% of the volatile ammonia nitrogen content of the solution. Losses were greatest immediately after application and decreased with time. Losses were proportional to the rate of application. Losses were not closely related to soil type, soil structure, moisture levels, soil reaction, or soil texture. There was a tendency for lower losses to occur from the soils which had higher organic matter levels. Where the solutions were injected into the soil to a depth of 2 inches, losses were measured in three out of nine trials, but greatest loss amounted to only 1.7% of the total nitrogen applied.

TABLE 1. Accumulative losses of ammonia to the atmosphere from surface applications of a low pressure nitrogen solution as affected by time and rate of application.

Location number	Application rate lb. N/A	Pounds per acre of volatile nitrogen lost in various time intervals (minutes) 25	50	100	200	400
	25	1.9	2.1	2.5	2.9	3.1
1. (Conover loam)	50	3.7	4.2	4.9	5.5	6.0
	100	7.5	8.5	9.7	11.2	12.6
	25	2.2	2.5	2.8	4.2	4.4
2. (Hillsdale loam)	50	4.0	4.6	5.4	6.0	6.5
	100	7.9	9.0	10.1	11.4	12.7
	25	2.0	2.2	2.5	2.8	3.0
3. (Hillsdale loam)	50	3.9	4.5	5.2	5.8	6.2
	100	7.9	8.9	10.0	11.2	12.5
	25	2.0	2.3	2.5	2.7	2.9
4. (Hillsdale loam)	50	4.0	4.7	5.4	6.0	6.5
	100	8.1	9.2	10.2	11.3	12.4
	25	2.1	2.3	2.5	2.9	3.1
5. (Kalamazoo sandy loam)	50	4.3	4.8	5.4	6.3	6.8
	100	8.8	13.6	15.0	16.8	18.2

1. Corn field. Soil was dry and crusted.
2. Wheat field. Soil was dry and granular.
3. Corn field. Soil was dry and crusted
4. Corn field. Soil was wet and crusted.
5. Corn field. Soil was dry and crusted.

TABLE 2. Losses of ammonia to the atmosphere from surface applications of a low pressure nitrogen solution as affected by various soil conditions.

Soil series	Soil reaction (pH)	Soil texture	Organic matter	Moisture level	Physical condition	Per cent nitrogen lost
Wisner	7.2	Clay loam	High	Moist	Granulated	13.4
Kalamazoo	6.5	Sandy loam	Low	Moist	Crusted	15.2
Kalamazoo	6.4	Sandy loam	Low	Air dry	Granulated	16.3
Kalamazoo	6.3	Sandy loam	Low	Moist	Crusted	10.9
Kalamazoo	6.3	Sandy loam	Low	Air dry	Crusted	14.2
Fox	6.2	Loam	Low	Air dry	Crusted	15.9
Warsaw	5.9	Silt loam	High	Moist	Crusted	11.0
Kalamazoo	5.9	Sandy loam	Low	Air dry	Granulated	11.5
Kalamazoo	5.0	Sandy loam	Low	Moist	Granulated	15.7

IMC to Offer Ten Sales Training Clinics

SKOKIE, ILL.—International Minerals & Chemical Corp. is offering a new series of 10 cross-country sales training clinics this fall for salesmen of fertilizer manufacturing companies.

The 10 sessions follow up last winter's series of meetings across the U.S. and Canada.

This year's meetings, scheduled for 10 cities between Oct. 12-Nov. 13, feature completely new material on basics for increasing fertilizer sales, the company said.

Total attendance is expected to be almost 500. Last year more than 350 representatives of 156 fertilizer manufacturing companies attended.

New slides, movies, and other visual aids will be used, and there will be skits depicting certain sales situations. The meeting programs will include several audience participation features.

Topics will be divided basically into two sections. The first is the planned sale, or "what you have to know" to find sales and "what you have to do" to prepare for them. The second is the planned action, or "using what you know."

Schedule of meeting cities and dates: Kansas City, Mo., Oct. 12-13; Shreveport, La., Oct. 15-16; Atlanta, Ga., Oct. 19-20; Tampa, Fla., Oct. 22-23; Raleigh, N.C., Oct. 26-27; Baltimore, Md., Oct. 28-29; New York, N.Y., Nov. 2-3; Columbus, Ohio, Nov. 5-6; Indianapolis, Ind., Nov. 9-10, and Minneapolis, Minn., Nov. 12-13.

Inventor, Consultant Joins C. O. Bartlett & Snow

CLEVELAND—William L. Wettlaufer, Buffalo, N.Y. inventor and specialist in vibratory screens and related equipment, has joined the C. O. Bartlett & Snow Co., Cleveland, as a consultant, announced Charles O. Bartlett, vice president in charge of sales.

The Wettlaufer product line, consisting of vibratory screens, packing units, blenders, granulators and centrifuges, was recently purchased by Bartlett & Snow.

Mr. Wettlaufer will work on new processing equipment development and do special application engineering concerned with Wettlaufer products.

Don Harting

R. J. Fosdick

Smith-Douglass Announces Two Personnel Changes

NORFOLK, VA.—Smith-Douglass Co., Inc., fertilizer and chemical manufacturer, has announced the transfer of R. J. (Dick) Fosdick to Texas City, Texas, where he will become assistant sales manager for fertilizer sales in the southwest. Mr. Fosdick has managed a sales territory for Smith-Douglass with headquarters at Cedar Rapids, for the last seven years.

It was announced simultaneously that Don Harting has been appointed to replace Mr. Fosdick. Mr. Harting is a native of northeast Iowa and joins Smith-Douglass after six years sales experience with the fertilizer division of Armour & Co. Prior to that, he managed a retail fertilizer sales business.

U.S., Mexican Governments Pool Efforts To Stop Blackflies in Key Citrus Areas

WASHINGTON—The citrus blackfly, a major insect pest, is being kept out of important citrus-producing areas of the U.S. and northern Mexico by the continuing cooperative efforts of the two governments against the insect, a U.S. Department of Agriculture official reports.

Maintenance of two blackfly-free zones in northern Mexico—through the use of parasitic wasps to keep blackfly populations at a low level south of the buffer zones and the prompt insecticidal treatment of new, small infestations in the buffer zones—is keeping commercial citrus groves of the two countries relatively free of this pest, according to Lev F. Curl, assistant director of plant pest control activities of USDA's Agricultural Research Service.

"The success that can be achieved when two countries strive to deal cooperatively with a mutual problem is demonstrated by the fact that the only infestations found on this side of the Mexican border were in 1955-56," Mr. Curl said. "Prompt applications of insecticidal sprays by the Texas State Department of Agriculture, the Texas citrus industry, and ARS eradicated the 33 infestations found in seven localities in the lower Rio Grande Valley of Texas."

Currently, citrus blackflies are established along Mexico's east and west coasts, and in a number of places in south-central Mexico. The buffer zones extend southward from 100 to 150 miles into the Mexican states that border on California, Arizona, and the Lower Rio Grande Valley of Texas. The two Mexican states that make up the east coast buffer zone produce much of Mexico's best citrus fruit.

Further south in Mexico, the continuing release and re-distribution of parasitic wasps by the Mexican Department of Agriculture provide an effective control in these areas of general infestations.

Last year, in the area around Victoria, Tamaulipas, Mexico, nearly a million parasites of three different species were released. Biological control specialists in Mexico constantly inspect citrus areas to determine balance between parasite and blackfly populations. When parasite numbers are low in one area, the specialists move in any excess from other areas. The parasitic enemies of the blackfly were collected in Asia by USDA scientists. They were shipped to Mexico, where they were released and their value demonstrated.

As a part of the cooperative two-nation attack on the citrus blackfly, Mexico and ARS have conducted citrus blackfly surveys in northern Mexico since 1949. During the year ending June, 1958, more than 1¼ million trees on almost 30,000 properties were inspected.

The Mexican Department of Agriculture also enforces quarantines aimed at preventing northward spread of the pest. Fruit and other plant materials are inspected to prevent infested material from entering blackfly-free areas.

Balanced against the good success of these many safeguards, Mr. Curl said, is the constant threat imposed by the blackfly population backed up farther south in Mexico. "We must remain alert for a possible breakthrough at any time," he declared.

The 1955-56 outbreak was the second time the pest had invaded and been eradicated from the U.S. The first occurred at Key West, Fla., in 1934. This infestation was eradicated in an intensive spray campaign that ended in 1937.

Blackflies feeding on leaves of citrus trees can make the trees unproductive faster than any other known citrus insect pest. A two-year uncontrolled attack can result in total crop failure. Blackflies have a secondary effect: During heavy infestations, the tops of leaves develop a heavy film of black smut. This is the sooty mold disease that develops in the droppings of the larval form of the black fly. A heavily-infested grove will look black from a distance, and the sooty mold disease considerably lowers fruit quality and quantity.

The citrus blackfly was first found in Mexico in the state of Sinaloa in 1935 by A. Dampf of the Mexican Department of Agriculture and A. C. Baker of USDA. After a slow start the blackflies spread throughout the country and have been found in practically all major Mexican citrus-producing areas.

"The citrus blackfly could be equally destructive in the U.S.," Mr. Curl said. "We have no assurance that it would be possible to duplicate Mexico's success in control of this pest with parasites, because of the extensive use of insecticides (which would kill the parasites) in and near the citrus groves of the U.S.

"A general infestation in all U.S. citrus-producing areas would cost millions of dollars annually to control—a cost that would eventually be felt by consumers."

REPRESENTATIVE NAMED

CHICAGO—Tamms Industries Co., Chicago, announced the appointment of the L. H. Herr Co., Denver, Colo., to represent the raw material division of Tamms Industries Co. in the state of Colorado, and portions of Wyoming and New Mexico.

PLEADS GUILTY

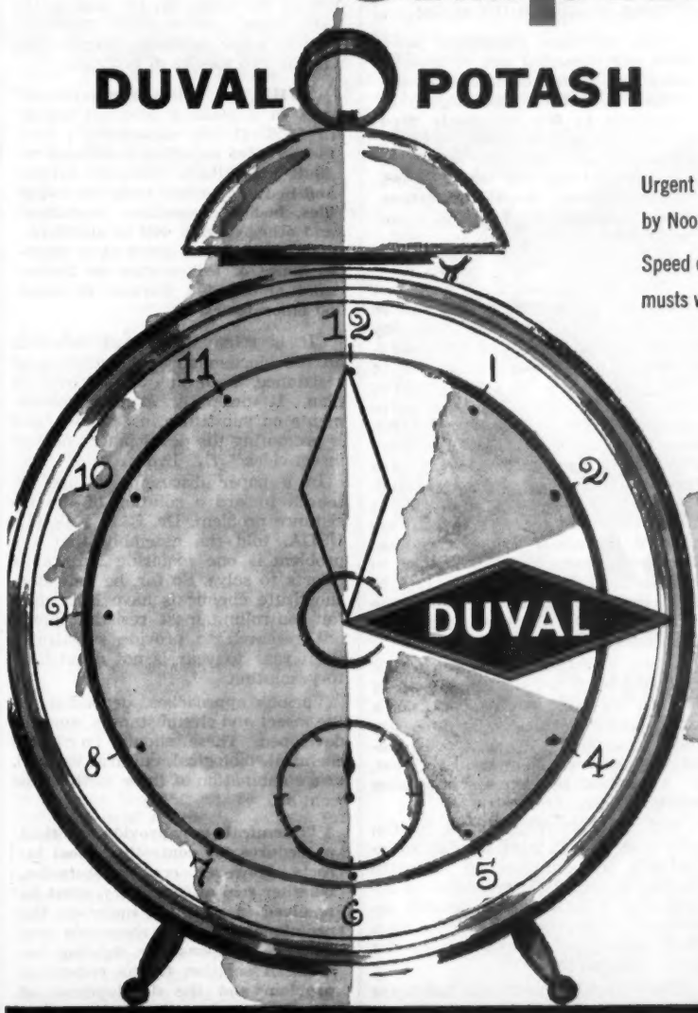
TOPEKA, KANSAS—R. L. Green, Iowa trucker, has pled guilty to violation of the Kansas Noxious Weeds Law in Osage County court, according to the Kansas state board of agriculture which administers the law.

The defendant pled guilty to selling feed oats infested with field bindweed seed. Inspection of the shipment by representatives of the agriculture board's noxious weeds division led to action against the defendant. Mr. Green was fined $100 and costs.

Elevators and others purchasing grain are advised to require inspection by the county weed supervisor prior to unloading of grain shipments. Trucking firms hauling feed grains or roughage in this state are urged to abide by provisions of the weed law to avoid penalty for violations.

same day shipment

DUVAL POTASH



Urgent orders shipped same day if received by Noon or possibly mid-afternoon.

Speed of handling and quality are always musts with Duval and Ashcraft-Wilkinson Co.

High Grade Muriate of Potash...

DUVAL SULPHUR & POTASH COMPANY

Exclusive Distributors

ASHCRAFT-WILKINSON CO.

HOME OFFICE

ATLANTA, GEORGIA

Cable address Ashcraft

Norfolk, Va. • Charleston, S. C. • Tampa, Fla. • Jackson, Miss. • Columbus, Ohio • Montgomery, Ala. • Des Moines, Iowa

RESISTANCE

(Continued from page 1)

ing acaricide schedules varied with the combinations selected.

"These results give evidence that the developmental program for a new acaricide should include as much laboratory information as is feasible on its toxicity to mites resistant to previously used acaricides," he said. "Also, its ability to develop resistance to chemically related compounds currently effective on the major insect and mite pests; and the rate mites become tolerant to the compound under investigation."

E. H. Glass, New York State Agricultural Experiment Station, Geneva, N.Y., reported on the status of resistant insects and mites attacking orchard crops. He said that resistant strains of thirteen insect and mite species are known to exist on six species of deciduous orchard trees in the United States.

On apple the codling moth is almost universally resistant in some degree to lead arsenate. More recently this insect has become resistant to DDT and certain DDT-related materials in at least some plantings in most of the major apple growing regions of the United States, Canada and Australia.

The red-banded leaf roller has become resistant to TDE in many orchards in the eastern part of North America. On apple one species of leafhopper (Erythroneura lawsonia Baker) in Kentucky was found to be resistant to DDT in 1953 and another species in New York was discovered to be resistant to DDT and TDE in 1959, he said.

Most of the apple infesting mites have developed resistance to parathion, TEPP, malathion and other related acaricides wherever these materials have been used regularly in the spray program. The European red mite, Pacific mite, two-spotted spider mite, McDaniel mite and a Bryobia mite have been reported resistant to at least one of these materials in one or more states.

The European red mite is also known to be resistant to ovex, Mitox and Fenson in a California apple planting. The latter species is also known to be resistant to parathion in certain pear, peach, plum and prune plantings. Similar experience is reported with phosphate resistance in mites on orchard crops in other parts of the world.

The cherry rust mite is reported resistant to some of the thiophosphates in Washington, he went on. In Washington and Oregon the green peach aphid has developed resistance to parathion in peach plantings. The peach silver mite is also resistant to parathion and other related products in these same states.

In California parathion-resistant strains of the walnut aphid have been found on walnut. Here also there are codling moths that appear to have developed a moderate degree of resistance to DDT.

Field entomologists, he reported, have been successful in solving pest control problems created by the development of resistance primarily by employing chemically unrelated pesticides. In some orchards the practice of frequent changing from one pesticide to another as new and better materials become available can delay or prevent development of resistance.

H. G. Johnston, National Cotton Council, Memphis, Tenn., described the impact of resistance of cotton insect pests upon the use and development of insecticides for control of these pests. He said that resistance poses a "tremendous threat" to efficient cotton production. "There is no place in the cotton belt where cotton can be produced efficiently year after year without insect control, and growers are wholly dependent upon insecticides for effective control.

"By 1958, no less than 16 species of insects and spider mites attacking cotton were known to be resistant or strongly suspected," he said. "One or more of these resistant species are found in localized areas of 11 states from California to North Carolina. Nine species are known to be resistant to one or more insecticides.

"The boll weevil, which showed resistance in 1955, is the most destructive pest of cotton in the U.S.—causing more than three-fourths of all insect losses. About 80% of the total cotton acreage and more than 95% of all cotton producers are involved. Cotton cannot be profitably produced in most areas where weevils occur without adequate control. Effective chemical control for boll weevils often intensifies population development and increases the chance of resistance of other pests. Resistant weevils are now found in seven states from Texas to North Carolina and suspected in two others," Mr. Johnston went on.

"USDA records of hibernating boll weevils at Tallulah, La., show that since 1947 there has been a 105% increase in the average number of weevils hibernating in the fall—but there has been an even greater increase of 207% in the number of surviving weevils in the spring.

"The increased population pressure and expanded use of insecticides for weevil control soon developed a rather high degree of resistance to five commonly used chlorinated hydrocarbons. Other chemicals are currently available that will control boll weevils—and other resistant species—but there is no assurance that any of these pests will not also develop resistance to them.

"Boll weevil resistance was first recognized in Louisiana and is more widespread in that state than any other. Annual reports of the insecticides sold in Louisiana show that in 1954 almost 98% of all insecticides used for boll weevil control were chlorinated hydrocarbons and by 1958 they made up only 34% of the total. Phosphorus insecticides, not available for boll weevil control until 1956, amounted to 55% of the total used in 1958. Calcium arsenate which accounted for about 2% of the total insecticides used in 1954 climbed to 28% in 1956, but dropped to 11% in 1958. Records for Arkansas show the same trend, but the break came one year later."

Other resistant species have created somewhat the same sort of pattern as boll weevils, but on a much smaller scale, he said. Spider mite resistance to organic phosphates, particularly in the Far West, is a serious problem and causing much concern.

"On a short-range basis, cotton pest resistance is being handled satisfactorily by changing to alternate chemicals with different modes of action. But if cotton pests develop resistance to alternate chemicals, then this cannot be the answer to the long-range problem."

The status of insecticide resistance in livestock pests was covered in a paper by W. C. McDuffie, USDA, Kerrville, Texas. He stated that during the past dozen years, insect resistance has become an increasingly serious problem, particularly as regards public health.

At the same time, he said, very little publicity has been given to resistance in the common pests of livestock and poultry. "Resistance in these pests is not yet such an acute problem in the U.S. as in other sections of the world, but it is increasing each year. At present house flies, numerous species of mosquitoes, the brown dog tick, the cat flea, and goat lice have been found resistant to one or more classes of insecticides.

"Reports have indicated that the chlorinated hydrocarbon insecticides are not as effective as formerly, and resistance is suspected but not definitely proved in the stable fly, horn fly, and primary screwworm fly, cattle lice, and poultry mites.

"In foreign countries resistance has been confirmed in species of mosquitoes, the stable fly, the sheep strike and other blow flies, at least three species of fleas, and several species of ticks. Most of the resistant species can be controlled with organic-phosphorus insecticides, but several species of mosquitoes and the house fly have already become resistant to this class of insecticides."

The insecticide resistance problem in the World Health Organization programs for vector control was discussed by A. W. A. Brown, head, department of zoology, University of Western Ontario, London, Canada. "No less than 50 arthropod species of public health importance have developed resistance to the chlorinated-hydrocarbon or organophosphorus insecticides," he said.

The problem is most serious in the anopheline vectors of malaria, of which 16 have developed resistance to dieldrin, and 4 to DDT and dieldrin; resistance now covers more than 5% of the world malaria eradication program. Resistance is of importance not only in the house fly, but also in the body louse, yellow-fever mosquito, tropical house mosquito, human flea, and the two species of bedbugs.

"WHO has taken countermeasures in a planned program begun in 1956. It has standardized test methods for detecting resistance in adult mosquitoes, mosquito larvae and body lice, while tests for house flies, bedbugs, sandflies, blackflies, and other species will be standardized soon. It has acted as a clearinghouse of information on resistance among 400 workers in some 60 laboratories.

"It is stimulating basic research on the biochemistry and genetics of resistance, according to an over-all plan. It promptly advises governments on substitute insecticides, and is promoting the development of new insecticides," Dr. Brown said.

In a paper discussing future research toward a solution of the resistance problem, Dr. E. F. Knipling, USDA, told the assembly that the problem is one requiring long-range efforts to solve. So far, he indicated, substitute chemicals have been used for controlling most resistant pests, but research to provide substitutes from year to year is not a satisfactory solution.

Various approaches, depending on the insect and circumstances, must be developed. These should include chemical, biological, cultural, varietal, or a combination of these methods, he went on.

"Chemicals now provide practical procedures for controlling most insects. However, certain obstacles, whether real or imaginary, must be resolved in order to maintain the prominent role that chemicals now hold as weapons for fighting insects. A solution to the resistance problem and the development of chemicals and methods of use that will assure minimum hazards to man, animals, wildlife, and beneficial insects must be given primary attention in our research efforts.

"Satisfactory immediate and long-range solutions to insect problems will require a reasonable share of the nation's resources for research. Basic investigations will be essential, but applied research must also be continued and strengthened to meet the day-to-day problems encountered in dealing with the thousands of species.

"In the area of chemical control, basic and applied research must be undertaken to discover new chemicals to prevent the development of insects. Attractants, repellents, growth inhibitors, insect nutrition, and insect physiology are areas of study that need more support. All research institutions, whether supported by industry or by the general public, must take a broad look at the problems and on this basis develop their programs. This will necessitate close cooperation of scientists in various disciplines.

"Federal and state institutions are probably in the best position to assume major responsibility for the fundamental aspects of entomology which could point the way to probable solutions to insect problems, but chemical industries should also conduct and support more investigations of this nature," the entomologist said.

"Our large and versatile chemical industries have the resources in materials, facilities, and scientists to develop basic information to the point of practical trials. Then in cooperation with the many federal and state stations devoting effort to applied entomology, maximum progress in achieving the objectives can be expected. The progress that has already been made can be attributed in large measure to the cooperation of public-supported research institutions and industry.

"The progress made in the future will depend on a continuation and strengthening of such cooperation, but on a much broader basis than in the past."

J. E. Johnson, Dow Chemical Co., Midland, Mich., presented a discussion of the problem from the standpoint of the chemical industry.

He told the group that the chemical industry, skilled in techniques of organic synthesis, is in a good position to make substantial contributions to a solution of the insect resistance problem. "This contribution can only be made, however, through full utilization of basic precepts as developed by geneticists, biochemists and entomologists," he said.

"Future industrial research should strive for insecticides with steep dosage response curves and formulations which minimize periods of high 'selective pressures.' Synthetic programs should be encouraged around compounds which show negatively-correlated cross-resistance. More extensive utilization of the labeled pool technique of metabolic investigation can help to elucidate the mode of action and thereby enable better understanding of resistance development.

"Since transport to the site of action is an integral part of insecticidal activity there needs to be more individual study of physical properties, partition coefficients, transport mechanism; as well as ultimate reaction at the 'biophase.'

"Meaningful screening tests are still needed, since knowledge of insect biochemistry often stems from a systematic investigation of compounds first discovered by empirical techniques. As the knowledge of basic insect biochemistry slowly develops, and as predictability becomes possible in view of a painfully organized science, it will then someday be possible to depend less on empirical techniques," he concluded.

Final paper of the symposium was presented by Dr. George R. Ferguson, Geigy Agricultural Chemicals, Ardsley, N.Y., who spoke on future pesticide research towards solving the resistance problem. He said development of insect resistance to chemicals has cut across the lines of practically all classes of compounds, and has included arsenicals, cyanide, tartar emetic and lime sulfur as well as the newer chlorinated hydrocarbon and organic phosphate insecticides. "The chemical industry, therefore, has a broad interest in this problem," he observed.

"The direction of future research in the chemical industry will probably

continue along the lines of synthesis and development of new patentable compounds with special efforts directed toward new active chemical groupings. Research in tax-supported institutions will probably tend toward greater emphasis on basic biological research in such fields as insect physiology, biochemistry, genetics and ecology," he said.

"The direction of chemical control of insects will undoubtedly tend toward more and more specific methods and treatments. There may even now be chemical tools available to handle specific problems but the markets may be too limited to allow the economic expenditure of the sums required for clearance for use. Specific narrow spectrum chemicals may require development support from tax-supported institutions for the solution to insect control problems on small acreage specialty crops. Future successful research will require both coordination and understanding between industry- and tax-supported institutions."

ICA Issues Three Viet Nam Authorizations

WASHINGTON—The International Cooperation Administration has issued three authorizations, amounting to $1.3 million, to Viet Nam for the purchase of fertilizers.

The authorizations consisted of $600,000 for nitrogenous fertilizers, $100,000 for potash fertilizers and $600,000 for phosphates and other fertilizer materials.

Purchases may be made from world sources under contracts entered prior to Feb. 29, 1960, with a final delivery date of not later than April 30, 1960.

NEW ENTOMOLOGIST

UNIVERSITY PARK, N.M.—Calvin C. Boykin, Jr., has been appointed agricultural economist with the farm economics research division of the Agricultural Research Service, USDA, with headquarters at New Mexico State University. He will work cooperatively with the department of agricultural economics of the NMSU Experiment Station.

Loy A. Everett

Commercial Solvents Names Chemical Sales Head

NEW YORK—Loy A. Everett has been appointed sales manager of Commercial Solvents Corp.'s agricultural chemicals sales department, according to an announcement by W. W. Jackson, vice president. Mr. Everett succeeds Clyde T. Marshall, who has resigned from the company.

For the past two years, Mr. Everett has been assistant sales manager of the department.

Mr. Everett's entire business career has been spent in fertilizer sales work. Prior to joining CSC, he was associated with the Virginia-Carolina Chemical Corp.

USDA Laboratory Dedication Set

ST. PAUL, MINN.—The new $489,989 building at the U.S. Department of Agriculture Soil and Water laboratory near Morris, Minn., will be dedicated Friday, Oct. 16.

Main speaker at the ceremonies will be Byron T. Shaw, administrator of the USDA Agricultural Research Service, Washington, D.C.

Other speakers will include H. J. Sloan, director of the University of Minnesota Agricultural Experiment Station; A. I. Johnson, Benson, Minn., member of the University Board of Regents; Milton Maxwell, LeSueur, Minn., president of the Minnesota Association of Soil and Water Conservation Districts, and Minnesota Congressmen Fred Marshall and Odin Langen.

C. A. Van Doren, head of the station, will be master of ceremonies. Dedication services will begin at 2 p.m.

The 161x61-foot building, now in final stages of completion, contains soil chemistry, physics and physiology laboratories; two controlled climate rooms; a small green house; a large sample preparation room; a farm machine shop, and offices for USDA staff members.

Also part of the structure is a special tower for studying the mechanics of rainfall—such as size of drops and intensity, and how these characteristics affect soil conservation and crop production.

The laboratory, established in 1958, is a center for soil and water management research for a 37-million-acre area covering western Minnesota, northwest Iowa and eastern North and South Dakota. Work at the laboratory is being done in close cooperation with the agricultural experiment stations of the four states. The laboratory area is adjacent to the University of Minnesota's west central school and experiment station.

There are now 2 engineers and 5 soils scientists on the laboratory staff, each of whom also has staff status at the University of Minnesota.

Du Pont Forms New French Company to Make Weed Killers

WILMINGTON, DEL.—Formation of a new French company, du Pont de Nemours (France) S A, with headquarters in Paris, to contract for the manufacture of weed killers in the expanding French market was announced by David H. Conklin, European director for the du Pont Co.

The new company, a wholly owned subsidiary of the parent company, will sell "Telvar" monuron and "Karmex" diuron weed killers for use in industrial and agricultural weed control.

PLANT TO MOVE

CHENEY, WASH.—The Green Acres Soil Service liquid fertilizer plant here is being moved from the Ratcliffe used equipment lot on the south edge of the city to a location two or three blocks further south and across the Northern Pacific tracks. The Green Acres Soil Service, which has the Elephant Brand liquid fertilizer franchise in the farming areas of Cheney, Spokane, the Spokane valley and Rathdrum, Idaho area, is owned by Albert and A. Dean Dinnison.

OUTPUT

(Continued from page 1)

short tons more than that produced in July 1958, however.

Total phosphoric acid produced was 140,312 short tons, down 7,606 short tons from June and up 469 short tons from year-ago figures. Of the 140,312 short tons, 87,236 short tons came from phosphate rock.

Fred M. Henley

Walter J. Kilmer

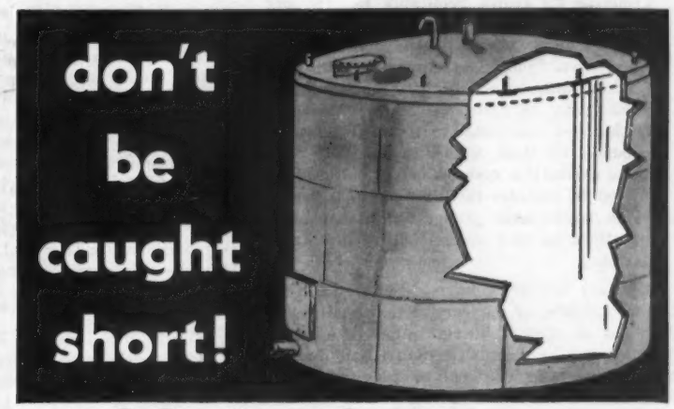
USI Names New Manager For Sales Division

NEW YORK—Walter J. Kilmer has been made manager of the Detroit sales division for U. S. Industrial Chemicals Co., division of National Distillers and Chemical Corp. Alden R. Ludlow, Jr., vice president in charge of sales, announced the new appointment. Mr. Kilmer succeeds Fred M. Henley, who is retiring.

Mr. Kilmer has been associated with U.S.I. for approximately 25 years and, prior to his new assignment, was a sales representative for the company at Buffalo, N.Y. His predecessor, Fred M. Henley, joined U.S.I. in 1923 at the company's Baltimore research laboratory. The following year he started a successful career as a salesman for U.S.I. at St. Louis, moving later to Cincinnati and then the Chicago sales office. In 1936 Mr. Henley went to Detroit where he has been U.S.I. division sales manager for the past several years.

CHEMIST DIES

WYNDMOOR, PA.—Robert C. White, Jr., 49, general manager of the Robert C. White Co., manufacturing chemists, died at his home recently in Wyndmoor.



Add Acid Storage Now At ¼ Normal Cost!

Now you can have all the storage you need for phosporic acid, ammonium nitrate, other acids and corrosive liquids.

You can convert or add ordinary, inexpensive tanks made of mild steel or even wood by simply installing amazing FLEXI-LINERS. These flexible, laminated plastic liners fit in tanks of any size or shape, hold from 100 to 30,000 gallons. Use them with tanks of any type . . . vertical, horizontal, or even open-top design. All outlets are built right in the liner.

FLEXI-LINERS
for all non-pressure storage

FLEXI-LINERS cost only one-fourth as much as high-priced stainless steel or rubber-lined vessels. You save even more by installing them easily yourself or with the help of our factory-trained servicemen.

Best of all, you'll get years of trouble-free performance from every FLEXI-LINER. Widely used in the chemical industry, FLEXI-LINERS have already built a reputation for long-life and economy.

Don't be caught short next season when FLEXI-LINERS can solve your extra storage problem at a 75% saving.

Write for FREE FOLDER and Price List

FLEXI-LINER COMPANY
359 EAST MAIN STREET • PHONE 8-4365 • DECATUR, ILLINOIS

Croplife®

A WEEKLY NEWSPAPER FOR THE FARM CHEMICAL INDUSTRY

The regional circulation of this issue is concentrated in the Midwestern states.

Economic Philosophy . . .

Maximum Profitability, Rather Than Mere Yield Increase, Object of Fertilization

By Dr. Vincent Sauchelli
Chemical Technologist
National Plant Food Institute
Washington, D.C.

"I use chemical fertilizers because it pays me to do so and my constant endeavor is to use the optimum amount which, in my belief, is synonymous with maximum profitability."

That declaration was made by a successful commercial farmer before a group of fertilizer manufacturers. He is a man with a technical background, whose family has been active in truck farming for several generations and apparently knows what it takes to stay in business. Profit is his motivation.

Let's examine what some others have described as their concept of fertilization. Here is what Dr. E. M. Crowther, late director of Rothamsted Agricultural Experiment Station in England, said:

> **"Fertilizers are often discussed as an aid to maintaining soil fertility, but an even more important function is to raise soil fertility sufficiently to allow better kinds of crops to be grown profitably in new and more productive systems of agriculture." This eminent scientist also has profit in mind even though he emphasizes the soil fertility build-up approach to profit and the need today to raise the fertility level to enable new and better varieties of plants to produce to their higher capacities. "The more productive systems of agriculture" referred to consider fertilizer as an indispensable factor with proper soil management practices in the realization of profitable farming.**

German scientists have devoted much study to the problems of food production on the limited cropland of their country. Intensive systems of farming are the rule in Germany. It is interesting therefore to note what one of their foremost representatives, Dr. Adolf Mayer, had to say on this subject. Dr. Mayer pointed out in all his teachings that fertilization had a dual purpose: To fertilize the soil and the crop. By this, he meant that it was necessary to build up and maintain a high level of fertility in the soil at all times in addition to supplying the crop with its needed nutrients. This advice should be taken to heart by all who have to do with profitable agriculture.

Now, let's see what a prominent American soil scientist and farmer has to say on this subject. Dr. George E. Smith of the Missouri Agricultural Experiment Station is recognized as one of our best authorities on the theory and use of fertilizers. In the application of fertilizers, says Dr. Smith, the purpose is changing from that of applying a certain quantity of mixed fertilizer which returned a greater value than its cost to that of removing soil fertility as a factor in production.

Except for the cost of fertilizer it costs but little more to bring a two-bale-an-acre cotton crop to time of harvest than a crop of only 300 pounds of lint; or a 100-bu.-an-acre corn crop than a 60-bu. crop.

> **You may have heard the question: Does a farmer use more fertilizer so as to make more profit an acre or because he already is making enough profit an acre to enable him to do so? Which is cause and which effect? This can become a vicious circle, as which came first, the chicken or the egg?**

Numerous studies have been published on this question based on surveys and statistical techniques. The industry would surely like to know the right answer. A. L. Mehring, formerly with the USDA, published several years ago an elaborately derived formula which purported to forecast fertilizer consumption. It was based on the concept that the amount of fertilizer purchased tended to follow the farmers' gross income for the previous year. Perhaps his reasoning was true when the tobacco and cotton crops dominated the farm situation. Conditions have changed and the Mehring formula no longer applies. Farmers today are more of the industrial type who are conscious of the fact that unit cost of production is a function of the yield. Higher rates of expenditure on fertilizers raise the profitability level.

If it were true that a farmer uses only that amount of fertilizer which his past year's profit enabled him to afford, it would be a dismal situation. Fortunately, the majority of those farmers who constitute the bulk of fertilizer consumers seem to spend on fertilizers a certain percentage of their income regardless of relationship to the previous year's profit level.

Surveys conducted by NPFI and other agencies show that on 100-acre farms and bigger, the crop yields and the net profit per acre are consistently higher where the rate of fertilizer application is higher. Of course, there is a limit to this relationship between fertilizer increments applied and profit returned; the greatest return per acre is at that point where the last increment of fertilizer just pays for itself. This maximum level of per acre profit is only too rarely realized by most farmers. Time and education will, it is hoped, increase the number that do.

★ ★ ★

CRITICS OF COMMERCIAL fertilizers (and there seem to be plenty of them, critics, that is) have a number of pet themes they put forward. Though forced to admit, grudgingly, that the application of fertilizers does increase crop yields, they attempt to cancel out this advantage by claims that foodstuffs grown on soil fertilized by "chemicals" are tasteless and of low nutritional value and that, eventually, these non-organic plant foods will sterilize or otherwise ruin the soil.

However, there is strong evidence that long-time application of commercial fertilizers to the soil is far from harmful. In a recent edition of "Plant Food Review" issued by the National Plant Food Institute, Jonathan Garst, an agricultural consultant, presents a number of evidences that soil not only can withstand the application of manufactured fertilizers, but improve in fertility as well.

The author points out the Rothamsted Experiment Station in England where accurate records have been kept for more than 100 years on chemical fertilizers vs. barnyard manure. This particular ground was the farm of John Lawes, frequently termed the father of commercial fertilizers. The soil there has been tilled for many centuries, and commercial plant foods have been applied since 1842.

Over the years, careful records have been kept, showing that those portions of test fields receiving commercial fertilizers out-produced those receiving only organic materials. Moreover, factors other than mere production are involved. "For example," says Mr. Garst, "weeds gave more trouble on the manured strip. In any case the test field proves that even on very old farmland, chemical fertilizer can be added to the soil in sufficient quantities for optimum fertility for at least 100 years without harmful effects."

Croplife's Home Office

Croplife®

EPA Member of Business Publications Audit

NBP Member of National Business Publications

CROPLIFE is a controlled circulation journal published weekly. Weekly distribution of each issue is made to the fertilizer manufacturers, pesticide formulators and basic chemical manufacturers. In addition, the dealer-distributor-farm adviser segment of the agricultural chemical industry is covered on a regional (crop-area) basis with a mailing schedule which covers consecutively, one each week, four geographic regions (Northeast, South, Midwest and West) of the U.S. with one of four regional dealer issues. To those not eligible for this controlled distribution Croplife subscription rate is $5 for one year ($8 a year outside the U.S.). Single copy price, 25¢.

LAWRENCE A. LONG
Editor

DONALD NETH
Managing Editor

EDITORIAL STAFF — John Cipperly, Washington Correspondent; George E. Swarbreck, Canadian and Overseas Editor; Emmet J. Hoffman, Marketing Editor; James L. Engfer, Editorial Assistant.

ADVERTISING STAFF—Wilfred E. Lingren, Advertising Director; Carl R. Vetter, Advertising Department Manager; Bruce A. Kirkpatrick, Advertising Production Manager; R. Dale Swenson, Promotion Manager.

BUSINESS STAFF—Martin E. Newell, Chairman of the Board of Directors; Milton B. Kihlstrum, President and Treasurer; Wilfred E. Lingren, Executive Vice President; Don E. Rogers, Vice President; Paul L. Dittemore, Vice President; Donald Neth, Secretary; T. A. Gaden, Circulation Manager; James G. Pattridge, Assistant Treasurer; Richard Ostlund, Office Manager; Walter O. Buchkosky, Production Superintendent.

BRANCH OFFICES

EASTERN STATES—Paul L. Dittemore, Manager; James W. Miller and George W. Potts, Advertising Sales Representatives; Suite 3214, 551 Fifth Ave., New York 17, N.Y. (Tel. Murray Hill 2-2185).

CENTRAL STATES—Don E. Rogers, Manager; Henry S. French, Assistant Manager; Amos W. Standish, Advertising Sales Representative; 2832 Board of Trade Bldg., 141 W. Jackson Blvd., Chicago 4, Ill. (Tel. Harrison 7-05/5).

SOUTHWEST—Martin E. Newell, Manager; Thomas E. Letch, Assistant Manager; 612 Board of Trade Bldg., Kansas City 5, Mo. (Tel. Victor 2-1350).

NORTHWEST—Paul A. Anderson, Advertising Sales Representative, P.O. Box 67, Minneapolis 40, Minn. (Tel. Franklin 4-5200).

WASHINGTON CORRESPONDENT — John Cipperly, 604 Hibbs Bldg., Washington, D. C. (Tel. Republic 7-8534).

EXECUTIVE AND EDITORIAL OFFICES — 2501 Wayzata Blvd., Minneapolis, Minn. Tel. Franklin 4-5200. Bell System Teletype Service at Minneapolis (MP 179), Kansas City (KC 295), Chicago (CG 340), New York (NY 1-2452), Washington, D.C. (WA 82).

Published by
THE MILLER PUBLISHING CO.
2501 Wayzata Blvd., Minneapolis, Minn.
(Address Mail to P. O. Box 67, Minneapolis 40, Minn.)

Associated Publications—The Northwestern Miller, The American Baker, Farm Store Merchandising, Feedstuffs, Milling Production.

Oct. 26-27—Aerial Sprayers and Dusters Conference, Hotel Chinook, Yakima, Wash.

Dec. 10-11—Arkansas Plant Food Conference, Lafayette Hotel, Little Rock, Ark.

1960

Jan. 13-14—Pesticide School, North Carolina State College, Raleigh, N.C.

Feb. 2-4—Pest Control Operators' School, North Carolina State College, Raleigh, N.C.

Meeting Memos listed above are being listed in this department this week for the first time.

Oct. 13-14—Western Agricultural Chemicals Assn., fall meeting, Villa Motel, San Mateo, Cal., C. O. Barnard, executive secretary.

Oct. 14-16—Pacific Northwest Plant Food Assn. Annual Convention, Chinook Hotel, Yakima, Wash.

Oct. 15—NPFI Conference on Chemical Control Problems, Shoreham Hotel, Washington, D.C.

Oct. 16—Association of American Fertilizer Control Officials, Shoreham Hotel, Washington, D.C.

Oct. 16-17—American Pesticide Control Officials, annual meeting, Shoreham Hotel, Washington, D.C.

Oct. 19-23—Fertilizer Section, National Safety Council, annual meeting, Chicago.

Oct. 21-23 — National Agricultural Chemicals Assn., 26th annual meeting, French Lick-Sheraton Hotel, French Lick, Ind., Lea S. Hitchner, executive secretary.

Oct. 27—Seventh Annual Grassland Farming Conference, Extension Service, Rutgers University College of Agriculture, New Brunswick, N.J.

Oct. 29-30—Far West Safety School, Hacienda Motel, Fresno, Cal.

Oct. 29-30 — Eastern Branch, Entomological Society of America, Chalfonte-Haddon Hotel, Atlantic City, N.J.

Oct. 30—North Dakota Fertilizer Dealers Conference, North Dakota Agricultural College, Fargo.

Nov. 3-4—Michigan Insecticide-Fungicide Conference, Michigan State University, East Lansing, Mich.

Nov. 4-5—Fifth Annual Oklahoma Fertilizer Dealers and Crops and Soils Conference, Stillwater, Okla.

Nov. 4-6—Fertilizer Industry Round Table, Mayflower Hotel, Washington, D.C. Dr. Vincent Sauchelli, National Plant Food Institute, chairman.

Nov. 8-10—National Fertilizer Solutions Assn., Annual Convention, Statler Hilton Hotel, St. Louis; Muriel F. Collie, 2217 Tribune Tower, Chicago 11, executive secretary.

Nov. 9—South Carolina Plant Food Educational Society annual meeting, Clemson House, Clemson, S.C.

Nov. 9-11 — California Fertilizer Assn., 36th annual convention, Fairmont Hotel, San Francisco.

Nov. 12-13 — Southwest Fertilizer Safety School, Tropicana Motor Hotel, Pasadena, Texas.

Nov. 16-20 — National Aviation Trades Assn., 20th annual convention, New Orleans, La.

Nov. 17-20 — Packaging Machinery Manufacturers Institute Show of 1959, The Coliseum, New York City.

Nov. 30-Dec. 4—27th Exposition of Chemical Industries, New York Coliseum, New York City.

Nov. 30-Dec. 5—Joint meeting, Entomological Society of Ontario; Entomological Society of Canada and Entomological Society of America, Hotel Sheraton-Cadillac, Detroit, Mich.

Dec. 1-2—Annual meeting, Carolinas-Virginia Pesticide Formulators Assn., Carolina Hotel, Pinehurst, N.C.

Dec. 2-3—Annual Missouri Fertilizer Conference, Columbia, Mo.

Dec. 7-10—Central Canada and North Central Weed Control Conferences, Royal Alexandra Hotel, Winnipeg, Manitoba, Can.

Dec. 9-11—International Crop Protection and Pest Control Exhibition, Seymour Hall, St. Marylebone, London, England.

Dec. 10—Iowa Fertilizer Promotion Workshop, Savery Hotel, Des Moines, Iowa.

Dec. 10-11—Annual Arkansas Plant Food Conference, Little Rock, Ark.

1960

Jan. 5-6—Annual Texas Fertilizer Conference, College Station, Texas.

Jan. 6-8—14th Annual Meeting, Northeastern Weed Control Conference, Hotel New Yorker, New York City.

Jan. 13-15—Ninth Annual Convention, Agricultural Ammonia Institute, Statler Hilton Hotel, Dallas, Texas.

Jan. 14-16—10th Annual Convention of the Agricultural Aircraft Assn., El Mirador Hotel, Palm Springs, Cal.

Jan. 20-21—North West Agricultural Chemicals Industry Conference, Benson Hotel, Portland, Ore., C. O. Barnard, executive secretary.

Jan. 20-22—Thirteenth Annual Southern Weed Conference, Buena Vista Hotel, Biloxi, Miss.

Jan. 25-26—Second Annual Agricultural Pesticide Conference, Purdue University, Lafayette, Ind.

Jan. 25-27—Cotton States Branch, Entomological Society of America, DeSoto Hotel, Savannah, Ga.

Jan. 27-29—Symposium on Chemistry of Phosphate-Soil Reactions, Muscle Shoals, Ala.

Jan. 28-29—Annual meeting of the Colorado Agricultural Chemicals Assn., Cosmopolitan Hotel, Denver, Colo.

Feb. 8-9—Southwestern Branch, Entomological Society of America, Hilton Hotel, El Paso, Texas.

Feb. 11-12 — Midwest Agronomists-Fertilizer Industry meeting, Edgewater Beach Hotel, Chicago, Ill.

March 23-25—North Central Branch, Entomological Society of America, Schroeder Hotel, Milwaukee, Wis.

June 13-18—National Plant Food Institute annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

June 27-29—Pacific Branch, Entomological Society of America, Davenport Hotel, Spokane, Wash.

July 13-15—Eleventh Annual Fertilizer Conference of the Pacific Northwest, Hotel Utah, Salt Lake City; B. R. Bertramson, State College of Washington, Pullman, Wash., chairman.

July 27-29—Great Plains Agricultural Council, 1960 meeting, Laramie, Wyo.

BRUSH AND WEED KILLERS

KILL BRUSH at low cost with amazing R-H BRUSH RHAP. Will not injure grasses, grains; not poisonous. For free information write Reasor-Hill Corporation, Box 36CL, Jacksonville, Ark.

KILL SUBMERSED WATER WEEDS which foul up motor propellers, tangle fishing gear, with R-H WEED RHAP-20, Granular 2,4-D. Inexpensive, easy to use, sure results. For free information write Reasor-Hill Corporation, Box 36CL, Jacksonville, Ark.

MR. CORN FARMER: Control broad leaved weeds and grasses (crab grass, fox tails) with R-H WEED RHAP-20, Granular 2,4-D. For free information write Reasor-Hill Corporation, Box 36CL, Jacksonville, Ark.

REMEMBER TO ORDER
CHASE BAGS
There's None Better!

CALENDAR FOR 1959-60

OCTOBER

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

NOVEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

DECEMBER

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

JANUARY

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

FEBRUARY

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29					

MARCH

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

APRIL

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

MAY

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

JUNE

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

JULY

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

AUGUST

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

SEPTEMBER

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

Classified Ads

Classified advertisements accepted until Tuesday each week for the issue of the following Monday.

Rates: 15¢ per word; minimum charge $2.25. Situations wanted, 10¢ a word; $1.50 minimum. Count six words of signature, whether for direct reply or keyed care this office. If advertisement is keyed, care of this office, 20¢ per insertion additional charged for forwarding replies. Commercial advertising not accepted in classified advertising department. Display advertising accepted for insertion at minimum rate of $11 per column inch.

All Want Ads cash with order.

MACHINERY FOR SALE

FOR SALE—ST. REGIS BAGGING Machine No. 327. Barber-Greene conveyor, 25 ft. long. Welcome Agricultural Chemical Co., Welcome, Minn.

HELP WANTED

WANTED—MANAGER FOR LARGE FERtilizer plant, north Midwest area. Plant is large granulation plant with superphosphate facilities. Give complete resume of age, education, experience and availability in first letter. Address Ad No. 5238, Croplife, Minneapolis 40, Minn.

Arkansas Conference

LITTLE ROCK, ARK.—The Arkansas Plant Food Conference will be held Dec. 10-11 at the Lafayette Hotel here, announced David E. Ryker, extension editor, agricultural extension service.

Part of the program will be devoted to a discussion of the use of lime, Mr. Ryker said.

FILES CHARTER

DOVER, DEL.—Ohio Valley Fertilizer Co. filed a charter of incorporation with the corporation department of the Secretary of State's office here. Authorized capital stock of the firm is $100,000. Corporation Service Co., Delaware Trust Building, Wilmington, Del., is serving as the principal office.

INDEX OF ADVERTISERS

The index of advertisers is provided as a service to readers and advertisers. The publisher does not assume any liability for errors or omissions.

Allied Chemical Corp., Nitrogen Div. ...
American Potash & Chemical Corp. .....
American Potash Institute .....
Armour Agricultural Chemical Co. .....
Ashcraft-Wilkinson Co. 19

Baker, H. J., & Bro. .....
Bemis Bro. Bag Co. .....
Broyhill Company, The 14

Chantland Mfg. Co. .....
Chase Bag Co. 23
Chemagro Corp. .....
Coddington, E. D., Mfg. Co. .....
Collier Carbon & Chemical Corp. .....
Commercial Solvents Corp. 15

Davison Chemical Co. .....
Deere, John, & Co. .....
Diamond Alkali Co. .....
Dorsey Trailer .....
E. I. du Pont de Nemours & Co., Inc.....
Duval Sulphur & Potash Co. 19

Eastern States Petroleum & Chem. Corp. ..

Gaddis Bros. Mfg. Co. 17
Grace Chemical Co. .....
Grand River Chemical Div. of Deere & Co. 16

Harshaw Chemical Co. .....
Hercules Powder Co. .....
Highway Equipment Co. .....
Hough, Frank G., Co. .....

International Minerals & Chemical Corp. .....
Iowa State Fertilizer Institute .....

Kent, Percy, Bag Co. .....
Kraft Bag Corp. .....

Meredith Publishing Co. 7
Meyer, Wilson & Geo., & Co. .....
Mid-South Chemical Corp. 6
Mid-States Machinery Co. 21
Miller Chem. & Fert. Corp. .....
Miller Publishing Co. 12
Monsanto Chemical Co. 4, 5

Naugatuck Chemical Div., U.S. Rubber Co.
Niagara Chemical Division .....

Olin Mathieson Chemical Corp. .....

Penick, S. B., & Co. .....
Pennsalt of Washington Division, Pennsalt Chemicals Corp. .....
Phillips Chemical Co., a subsidiary of Phillips Petroleum Co. .....
Potash Company of America 3
Power Curve Conveyor .....
Progressive Farmer .....

Reasor-Hill Corp. 23

Sackett, A. J., & Sons .....
Simonsen Mfg. Co. .....
Sinclair Chemicals, Inc. .....
Smith-Douglass Co., Inc. 11
Smith-Rowland Co., Inc. 11
Sohio Chemical Co. .....
Southern Nitrogen Co. .....
Southwest Potash Corp. .....
Spencer Chemical Co. 13
Spraying Systems Co. .....
Standard Oil Co. .....
Successful Farming 7
Swift & Co. .....

Tennessee Corp. .....
Texas Gulf Sulphur Co. .....

Union Bag-Camp Paper Corp. .....
U.S. Phosphoric Products Division .....
U.S. Potash Co. .....
U.S. Rubber Co., Naugatuck Chemical Div.

Witco Chemical Co. .....

CROPLIFE's sharp, incisive reporting is studied every 7 days by the agricultural chemical industry . . .

CROPLIFE's spot diagnosis of the shifting agricultural chemical scene represents a powerful influence on this 2 billion dollar market . . .

National Coverage Weekly . . .

Croplife's carefully controlled circulation provides national coverage weekly of manufacturers, formulators, mixers and ingredient suppliers.

Plus Regional Coverage by Marketing-Areas . . .

In addition, a unique regional circulation plan provides advertisers with a selective marketing-area coverage of wholesale and retail dealers and farm advisory personnel.

WRITE—WIRE—PHONE our nearest office for a complete analysis of Croplife's important role in your advertising program.

Here is a COMPLETE advertising medium with COMPLETE coverage of the market . . .

Croplife

New York, 551 Fifth Ave.
Murray Hill 2-2185

Minneapolis, 2501 Wayzata Boulevard
Franklin 4-5200

NBP
Member of National Business Publications

BPA
Member of Business Publications Audit

Chicago, 2832 Board of Trade Bldg.
Harrison 7-0515

Kansas City, 612 Board of Trade Bldg.
Victor 2-1350